City of San Diego

CONTRACTOR'S NAME: Soltek-ECC A Joint Venture
ADDRESS: 2424 Congress Street, San Diego, CA 92110
TELEPHONE NO.: (619) 440-7181 **FAX NO.:**
CITY CONTACT: Juan E. Espindola, Senior Contract Specialist, Email: JEEspindola@sandiego.gov
Phone No. (619) 533-4491
Z. Rummani / M. Jirjis Nakasha / E. G. Zuniga

BIDDING DOCUMENTS

e - Bidding

FOR

PACIFIC HIGHLANDS RANCH BRANCH LIBRARY

BID NO.: **K-22-1950-DBB-3-A**
SAP NO. (WBS/IO/CC): **S-14023**
CLIENT DEPARTMENT: **1713**
COUNCIL DISTRICT: **1**
PROJECT TYPE: **BD**

THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM
- PREVAILING WAGE RATES: STATE ☒ FEDERAL ☐
- APPRENTICESHIP

BID DUE DATE:

2:00 PM
JANUARY 5, 2022

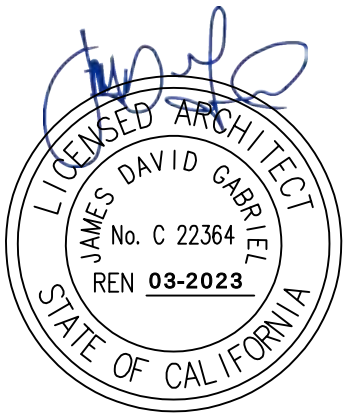
CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

http://www.sandiego.gov/cip/bidopps/index.shtml

ENGINEER OF WORK

The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Architect:

1) Registered Architect — 11/8/2021 (Date) — Seal:



2) For City Engineer — 11/15/2021 (Date) — Seal:

TABLE OF CONTENTS

SECTION **PAGE**

REQUIRED DOCUMENTS SCHEDULE DURING BIDDING AND AWARDING

The Bidder's attention is directed to the City's Municipal Code §22.0807(e), (3)-(5) for important information regarding grounds for debarment for failure to submit required documentation.

The specified Equal Opportunity Contracting Program (EOCP) forms are available for download from the City's web site at:

http://www.sandiego.gov/eoc/forms/index.shtml

ITEM	DOCUMENT TO BE SUBMITTED	WHEN DUE	FROM
1.	Bid Bond (PDF via PlanetBids)	At Time of Bid	ALL BIDDERS
2.	Contractors Certification of Pending Actions	At Time of Bid	ALL BIDDERS
3.	List of Subcontractors for Alternate Items	At Time of Bid	ALL BIDDERS
4.	Mandatory Disclosure of Business Interests	At Time of Bid	ALL BIDDERS
5.	Debarment and Suspension Certification for Prime Contractors	At Time of Bid	ALL BIDDERS
6.	Debarment and Suspension Certification for Subcontractors, Suppliers & Mfgrs	At Time of Bid	ALL BIDDERS
7.	Bid Bond (Original)	By 5PM 3 working days after bid opening	ALL BIDDERS
8.	SLBE Good Faith Effort Documentation	By 5 PM 3 working days after bid opening	ALL BIDDERS
9.	Form AA60 – List of Work Made Available	By 5 PM 3 working days after bid opening with Good Faith Effort (GFE) documentation	ALL BIDDERS
10.	If the Contractor is a Joint Venture: • Joint Venture Agreement • Joint Venture License	Within 10 working days of receipt by bidder of contract forms	AWARDED BIDDER
11.	Payment & Performance Bond; Certificates of Insurance & Endorsements; and Signed Contract Agreement Page	Within 10 working days of receipt by bidder of contract forms and NOI	AWARDED BIDDER

ITEM	DOCUMENT TO BE SUBMITTED	WHEN DUE	FROM
12.	Listing of "Other Than First Tier" Subcontractors	Within 10 working days of receipt by bidder of contract forms	AWARDED BIDDER

NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **Pacific Highlands Ranch Branch Library.** This project also will improve the curb ramps and street pavement and construct storm water permanent BMP (Best Management Practice). For additional information refer to Attachment A.

2. **FULL AND OPEN COMPETITION:** This solicitation is subject to full and open competition and may be bid by Contractors on the City's approved Prequalified Contractors List. For information regarding the Contractors Prequalified list visit the City's web site: http://www.sandiego.gov.

3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **$19,000,000**.

4. **BID DUE DATE AND TIME ARE: JANUARY 5, 2022 at 2:00 PM.**

5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.

6. **LICENSE REQUIREMENT**: To be eligible for award of this contract, Prime contractor must possess the following licensing classification: **B**

7. **SUBCONTRACTING PARTICIPATION PERCENTAGES**: Subcontracting participation percentages apply to this contract.

7.1. The City has incorporated **mandatory** SLBE-ELBE subcontractor participation percentages to enhance competition and maximize subcontracting opportunities. For the purpose of achieving the mandatory subcontractor participation percentages, a recommended breakdown of the SLBE and ELBE subcontractor participation percentages based upon certified SLBE and ELBE firms has also been provided to achieve the mandatory subcontractor participation percentages:

1. SLBE participation **2.8%**
2. ELBE participation **5.6%**
3. Total mandatory participation **8.4%**

7.2. The Bid may be declared non-responsive if the Bidder fails to meet the following requirements:

7.2.1. Include SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; OR

Submit Good Faith Effort (GFE) documentation, saved in searchable Portable Document Format (PDF), demonstrating the Bidder made a good faith effort to conduct outreach to and include SLBE-ELBE Subcontractors as required in this solicitation by 5 PM 3 Working Days after the Bid opening if the overall mandatory participation percentage is not met.

All submittals in searchable PDF shall be submitted electronically within the prescribed time identified in the contract documents via PlanetBids by invitation to the point of contact named in the bid provided by the Contract Specialist to all bidders.

8. AWARD PROCESS:

8.1. The Award of this contract is contingent upon the Contractor's compliance with all conditions of Award as stated within these documents and within the Notice of Intent to Award.

8.2. Upon acceptance of bids and determination of the apparent low bidder, the City will prepare the contract documents for execution within approximately 21 days of the date of the bid opening. The City will then award the contract upon receipt of properly signed Contract, bonds, and insurance documents.

8.3. This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form by the City Attorney's Office.

8.4. The low Bid will be determined by the Base Bid plus all the Alternates.

8.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base bid alone; or for the Base bid plus one or more alternates.

9. SUBMISSION OF QUESTIONS:

9.1. The Director (or Designee) of the Purchasing & Contracting Department is the officer responsible for opening, examining, and evaluating the competitive Bids submitted to the City for the acquisition, construction and completion of any public improvement except when otherwise set forth in these documents. Any questions related to this solicitation shall be submitted to:

JEEspindola@sandiego.gov

9.2. Questions received less than 14 days prior to the date for opening of Bids may not be considered.

9.3. Questions or clarifications deemed by the City to be material shall be answered via issuance of an addendum and posted to the City's online bidding service.

9.4. Only questions answered by formal written addenda shall be binding. Oral and other interpretations or clarifications shall be without legal effect. It is the Bidder's responsibility to be informed of any addenda that have been issued and to include all such information in its Bid.

10. ADDITIVE/DEDUCTIVE ALTERNATES:

10.1. The additive/deductive alternates have been established to allow the City to compare the cost of specific portions of the Work with the Project's budget and enable the City to make a decision whether to incorporate these portions prior to award. The award will be established as described in the Bid. The City reserves the right to award the Contract for the Base Bid only or for the Base Bid plus one or more Alternates.

1. PREQUALIFICATION OF CONTRACTORS:

1.1. Contractors submitting a Bid must be pre-qualified for the total amount proposed, including all alternate items, prior to the date of submittal. Bids from contractors who have not been pre-qualified as applicable and Bids that exceed the maximum dollar amount at which contractors are pre-qualified may be deemed **non-responsive** and ineligible for award.

1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening.

1.3. **Joint Venture Bidders Cumulative Maximum Bidding Capacity:** For projects with an engineer's estimate of $30,000,000 or greater, Joint Ventures submitting bids may be deemed responsive and eligible for award if the cumulative maximum bidding capacity of the individual Joint Venture entities is equal to or greater than the total amount proposed.

1.3.1. Each of the entities of the Joint Venture must have been previously prequalified at a minimum of $15,000,000.

1.3.2. Bids submitted with a total amount proposed of less than $30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification. To be eligible for award in this scenario, the Joint Venture itself or at least one of the Joint Venture entities must have been prequalified for the total amount proposed.

1.3.3. Bids submitted by Joint Ventures with a total amount proposed of $30,000,000 or greater on a project with an engineer's estimate of less than $30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification.

1.3.4. The Joint Venture designated as the Apparent Low Bidder shall provide evidence of its corporate existence and furnish good and approved bonds in the name of the Joint Venture within 14 Calendar Days of receipt by the Bidder of a form of contract for execution.

1.4. Complete information and links to the on-line prequalification application are available at:

http://www.sandiego.gov/cip/bidopps/prequalification

1.5. Due to the City's responsibility to protect the confidentiality of the contractors' information, City staff will not be able to provide information regarding contractors' prequalification status over the telephone. Contractors may access real-time information about their prequalification status via their vendor profile on PlanetBids™.

2. ELECTRONIC FORMAT RECEIPT AND OPENING OF BIDS: Bids will be received in electronic format (eBids) EXCLUSIVELY at the City of San Diego's electronic bidding (eBidding) site, at: http://www.sandiego.gov/cip/bidopps/index.shtml and are due by the date, and time shown on the cover of this solicitation.

2.1. BIDDERS MUST BE PRE-REGISTERED with the City's bidding system and possess a system-assigned Digital ID in order to submit and electronic bid.

2.2. The City's bidding system will automatically track information submitted to the site including IP addresses, browsers being used and the URLs from which information was submitted. In addition, the City's bidding system will keep a history of every login instance including the time of login, and other information about the user's computer configuration such as the operating system, browser type, version, and more. Because of these security features, Contractors who disable their browsers' cookies will not be able to log in and use the City's bidding system.

2.3. The City's electronic bidding system is responsible for bid tabulations. Upon the bidder's or proposer's entry of their bid, the system will ensure that all required fields are entered. **The system will not accept a bid for which any required information is missing.** This includes all necessary pricing, subcontractor listing(s) and any other essential documentation and supporting materials and forms requested or contained in these solicitation documents.

2.4. BIDS REMAIN SEALED UNTIL BID DEADLINE. eBids are transmitted into the City's bidding system via hypertext transfer protocol secure (https) mechanism using SSL 128-256 bit security certificates issued from Verisign/Thawte which encrypts data being transferred from client to server. Bids submitted prior to the "Bid Due Date and Time" are not available for review by anyone other than the submitter who has until the "Bid Due Date and Time" to change, rescind or retrieve its proposal should it desire to do so.

2.5. BIDS MUST BE SUBMITTED BY BID DUE DATE AND TIME. Once the bid deadline is reached, no further submissions are accepted into the system. Once the Bid Due Date and Time has lapsed, bidders, proposers, the general public, and City staff are able to immediately see the results on line. City staff may then begin reviewing the submissions for responsiveness, EOCP compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.

2.6. RECAPITULATION OF THE WORK. Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.

2.7. **BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.

2.7.1. Important Note: Submission of the electronic bid into the system may not be instantaneous. Due to the speed and capabilities of the user's internet service provider (ISP), bandwidth, computer hardware and other variables, it may take time for the bidder's submission to upload and be received by the City's eBidding system. It is the bidder's sole responsibility to ensure their bids are received on time by the City's eBidding system. The City of San Diego is not responsible for bids that do not arrive by the required date and time.

2.8. **ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE:** To request a copy of this solicitation in an alternative format, contact the Purchasing & Contracting Department Public Works Division, Contract Specialist listed on the cover of this solicitation at least five (5) working days prior to the Bid/Proposal due date to ensure availability.

3. ELECTRONIC BID SUBMISSIONS CARRY FULL FORCE AND EFFECT:

3.1. The bidder, by submitting its electronic bid, acknowledges that doing so carries the same force and full legal effect as a paper submission with a longhand (wet) signature.

3.2. By submitting an electronic bid, the bidder certifies that the bidder has thoroughly examined and understands the entire Contract Documents (which consist of the plans and specifications, drawings, forms, affidavits and the solicitation documents), and that by submitting the eBid as its bid proposal, the bidder acknowledges, agrees to and is bound by the entire Contract Documents, including any addenda issued thereto, and incorporated by reference in the Contract Documents.

3.3. The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certification, forms and affidavits submitted as part of this bid are true and correct.

3.4. The Bidder agrees to the construction of the project as described in Attachment "A– Scope of Work" for the City of San Diego, in accordance with the requirements set forth herein for the electronically submitted prices. The Bidder guarantees the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent.

4. BIDS ARE PUBLIC RECORDS: Upon receipt by the City, Bids shall become public records subject to public disclosure. It is the responsibility of the respondent to clearly identify any confidential, proprietary, trade secret or otherwise legally privileged information contained within the Bid. General references to sections of the California Public Records Act (PRA) will not suffice. If the Contractor does not provide applicable case law that clearly establishes that the requested information is exempt from the disclosure requirements of the PRA, the City

shall be free to release the information when required in accordance with the PRA, pursuant to any other applicable law, or by order of any court or government agency, and the Contractor will hold the City harmless for release of this information.

5. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:

5.1. **Prior** to the Award of the Contract or Task Order, you and your Subcontractors and Suppliers must register with the City's web-based vendor registration and bid management system. For additional information go to:

http://www.sandiego.gov/purchasing/bids-contracts/vendorreg

5.2. The City may not award the contract until registration of all subcontractors and suppliers is complete. In the event this requirement is not met within the time frame specified in the Notice of Intent to Award letter, the City reserves the right to rescind the Notice of Award / Intent to Award and to make the award to the next responsive and responsible bidder / proposer.

6. JOINT VENTURE CONTRACTORS: Provide a copy of the Joint Venture agreement and the Joint Venture license to the City within 14 Calendar Days after receiving the Contract forms.

7. INSURANCE REQUIREMENTS:

7.1. All certificates of insurance and endorsements required by the contract are to be provided upon issuance of the City's Notice of Intent to Award letter.

7.2. Refer to sections 5-4, "INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.

8. REFERENCE STANDARDS: Except as otherwise noted or specified, the Work shall be completed in accordance with the following standards:

Title	Edition	Document Number
Standard Specifications for Public Works Construction ("The GREENBOOK") http://www.greenbookspecs.org/	2018	PWPI010119-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* https://www.sandiego.gov/ecp/edocref/greenbook	2018	PWPI010119-02
City of San Diego Standard Drawings* https://www.sandiego.gov/ecp/edocref/standarddraw	2018	PWPI010119-03
Citywide Computer Aided Design and Drafting (CADD) Standards https://www.sandiego.gov/ecp/edocref/drawings	2018	PWPI010119-04
California Department of Transportation (CALTRANS) Standard Specifications https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications	2018	PWPI030119-05

Title	Edition	Document Number
CALTRANS Standard Plans https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications	2018	PWPI030119-06
California Manual on Uniform Traffic Control Devices Revision 6 (CA MUTCD Rev 6) https://dot.ca.gov/programs/safety-programs/camutcd/camutcd-files	2014	PWPI060121-10
NOTE: *Available online under Engineering Documents and References at: https://www.sandiego.gov/ecp/edocref/ ***Electronic updates to the Standard Drawings may also be found in the link above		

9. **CITY'S RESPONSES AND ADDENDA:** The City, at its discretion, may respond to any or all questions submitted in writing via the City's eBidding web site in the **form of an addendum**. No other responses to questions, oral or written shall be of any force or effect with respect to this solicitation. The changes to the Contract Documents through addenda are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.

10. **CITY'S RIGHTS RESERVED:** The City reserves the right to cancel the Notice Inviting Bids at any time, and further reserves the right to reject submitted Bids, without giving any reason for such action, at its sole discretion and without liability. Costs incurred by the Bidder(s) as a result of preparing Bids under the Notice Inviting Bids shall be the sole responsibility of each bidder. The Notice Inviting Bids creates or imposes no obligation upon the City to enter a contract.

11. **CONTRACT PRICING:** This solicitation is for a Lump Sum contract with Unit Price provisions as set forth herein. The Bidder agrees to perform construction services for the City of San Diego in accordance with these contract documents for the prices listed below. The Bidder further agrees to guarantee the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee may be extended, by mutual consent of the parties, by the number of days required for the City to obtain all items necessary to fulfill all contractual conditions.

12. **SUBCONTRACTOR INFORMATION:**

12.1. **LISTING OF SUBCONTRACTORS**. In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act" of the California Public Contract Code, the Bidder shall provide the **NAME** and **ADDRESS** of each Subcontractor who will perform work, labor, render services or who specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also state within the description, whether the subcontractor is a **CONSTRUCTOR**, **CONSULTANT** or **SUPPLIER**. The Bidder shall state the **DIR REGISTRATION NUMBER** for all subcontractors and shall further state within the description, the **PORTION** of the work which will be performed by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement

may result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions – "Section 3-2 Self-Performance", which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which Bidders are seeking recognition towards achieving any mandatory, voluntary (or both) subcontracting participation goals.

Additionally, pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder shall provide the name, address, license number, DIR registration number of any Subcontractor – regardless of tier** - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract.

12.2. LISTING OF SUPPLIERS. Any Bidder seeking the recognition of Suppliers of equipment, materials, or supplies obtained from third party Suppliers towards achieving any mandatory or voluntary (or both) subcontracting participation goals shall provide, at a minimum, the **NAME**, **LOCATION (CITY), DIR REGISTRATION NUMBER** and the **DOLLAR VALUE** of each supplier. The Bidder will be credited up to 60% of the amount to be paid to the Suppliers for materials and supplies unless vendor manufactures or substantially alters materials and supplies, in which case, 100% will be credited. The Bidder is to indicate within the description whether the listed firm is a supplier or manufacturer. If no indication is provided, the listed firm will be credited at 60% of the listed dollar value for purposes of calculating the Subcontractor Participation Percentage.

12.3. LISTING OF SUBCONTRACTORS OR SUPPLIERS FOR ALTERNATES. For subcontractors or suppliers to be used on additive or deductive alternate items, in addition to the above requirements, bidder shall further note "ALTERNATE" and alternate item number within the description.

13. SUBMITTAL OF "OR EQUAL" ITEMS: See Section 4-6, "Trade Names" in The WHITEBOOK and as amended in the SSP.

14. AWARD:

14.1. The Award of this contract is contingent upon the Contractor's compliance with all conditions precedent to Award.

14.2. Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening and award the Contract approximately within 7 days of receipt of properly executed Contract, bonds, and insurance documents.

14.3. This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form the City Attorney's Office.

15. **SUBCONTRACT LIMITATIONS**: The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 3-2, "SELF-PERFORMANCE" in The GREENBOOK and as amended in the SSP which requires the Contractor to self-perform not less than the specified amount. Failure to comply with this requirement shall render the bid **non-responsive** and ineligible for award.

16. **AVAILABILITY OF PLANS AND SPECIFICATIONS:** Contract Documents may be obtained by visiting the City's website: http://www.sandiego.gov/cip/. Plans and Specifications for this contract are also available for review in the office of the City Clerk or Purchasing & Contracting Department, Public Works Division.

17. **ONLY ONE BID PER CONTRACTOR SHALL BE ACCCEPTED:** No person, firm, or corporation shall be allowed to make, file, or be interested in more than one (1) Bid for the same work unless alternate Bids are called for. A person, firm or corporation who has submitted a sub-proposal to a Bidder, or who has quoted prices on materials to a Bidder, is not hereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or from submitting a Bid in its own behalf. Any Bidder who submits more than one bid will result in the rejection of all bids submitted.

18. **SAN DIEGO BUSINESS TAX CERTIFICATE:** The Contractor and Subcontractors, not already having a City of San Diego Business Tax Certificate for the work contemplated shall secure the appropriate certificate from the City Treasurer, Civic Center Plaza, First floor and submit to the Contract Specialist upon request or as specified in the Contract Documents. Tax Identification numbers for both the Bidder and the listed Subcontractors must be submitted on the City provided forms within these documents.

19. **BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY) FOR DESIGN-BID-BUILD CONTRACTS:**

19.1. For bids $250,000 and above, bidders shall submit Bid Security at bid time. Bid Security shall be in one of the following forms: a cashier's check, or a properly certified check upon some responsible bank; or an approved corporate surety bond payable to the City of San Diego for an amount of not less than 10% of the total bid amount.

19.2. This check or bond, and the monies represented thereby, will be held by the City as a guarantee that the Bidder, if awarded the contract, will in good faith enter into the contract and furnish the required final performance and payment bonds.

19.3. The Bidder agrees that in the event of the Bidder's failure to execute this contract and provide the required final bonds, the money represented by the cashier's or certified check will remain the property of the City; and the Surety agrees that it will pay to the City the damages, not exceeding the sum of 10% of the amount of the Bid, that the City may suffer as a result of such failure.

19.4. At the time of bid submission, bidders must upload and submit an electronic PDF copy of the aforementioned bid security. Whether in the form of a cashier's check, a properly certified check or an approved corporate surety bond payable to the City of San Diego, the bid security must be uploaded to the City's eBidding system. By 5PM, 3 working days after the bid opening date, all bidders must provide the City with the original bid security.

19.5. Failure to submit the electronic version of the bid security at the time of bid submission AND failure to provide the original by 5PM, 3 working days after the bid opening date shall cause the bid to be rejected and deemed **non-responsive**.

Due to circumstances related to Covid-19, until further notice, all original bid bond submittals must be received by 5 PM, 3 working days after bid opening.

Upon circumstances returning to normal business as usual, the original bid bond shall once again be due by 5 PM the day after bid opening.

Original Bid Bond shall be submitted to:
Purchasing & Contracting Department, Public Works Division
525 B Street, Suite 750 (7th Floor)
San Diego, California, 92101
To the Attention of the Contract Specialist on the Front Page of this solicitation.

20. AWARD OF CONTRACT OR REJECTION OF BIDS:

20.1. This contract may be awarded to the lowest responsible and reliable Bidder.

20.2. Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.

20.3. The City reserves the right to reject any or all Bids, to waive any informality or technicality in Bids received, and to waive any requirements of these specifications as to bidding procedure.

20.4. Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City within 3 Working Days of the bid opening, written notice from the Bidder which shows proof of honest, credible, clerical error of a material nature, free from fraud or fraudulent intent; and of evidence that reasonable care was observed in the preparation of the Bid.

20.5. A bidder who is not selected for contract award may protest the award of a contract to another bidder by submitting a written protest in accordance with the San Diego Municipal Code.

20.6. The City of San Diego will not discriminate in the award of contracts with regard to race, religion creed, color, national origin, ancestry, physical handicap, marital status, sex or age.

20.7. Each Bid package properly signed as required by these specifications shall constitute a firm offer which may be accepted by the City within the time specified herein.

20.8. The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of the base bid and any proposed alternates or options as detailed herein.

21. BID RESULTS:

21.1. The availability of the bids on the City's eBidding system shall constitute the public announcement of the apparent low bidder. In the event that the apparent low bidder is subsequently deemed non-responsive or non-responsible, a notation of such will be made on the eBidding system. The new ranking and apparent low bidder will be adjusted accordingly.

21.2. To obtain the bid results, view the results on the City's web site, or request the results by U.S. mail and provide a self-addressed, stamped envelope. If requesting by mail, be sure to reference the bid name and number. The bid tabulations will be mailed to you upon their completion. The results will not be given over the telephone.

22. THE CONTRACT:

22.1. The Bidder to whom award is made shall execute a written contract with the City of San Diego and furnish good and approved bonds and insurance certificates specified by the City within 14 days after receipt by Bidder of a form of contract for execution unless an extension of time is granted to the Bidder in writing.

22.2. If the Bidder takes longer than 14 days to fulfill these requirements, then the additional time taken shall be added to the Bid guarantee. The Contract shall be made in the form adopted by the City, which includes the provision that no claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

22.3. If the Bidder to whom the award is made fails to enter into the contract as herein provided, the award may be annulled and the Bidder's Guarantee of Good Faith will be subject to forfeiture. An award may be made to the next lowest responsible and reliable Bidder who shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made.

22.4. Pursuant to the San Diego City Charter section 94, the City may only award a public works contract to the lowest responsible and reliable Bidder. The City will require the Apparent Low Bidder to (i) submit information to determine the Bidder's responsibility and reliability, (ii) execute the Contract in form provided by the City, and (iii) furnish good and approved bonds and insurance certificates specified by the City within 14 Days, unless otherwise approved by the City, in writing after the Bidder receives notification from the City, designating the Bidder as the Apparent Low Bidder and formally requesting the above mentioned items.

22.5. The award of the Contract is contingent upon the satisfactory completion of the above-mentioned items and becomes effective upon the signing of the Contract by the Mayor or designee and approval as to form by the City Attorney's Office. If the Apparent Low Bidder does not execute the Contract or submit required documents and information, the City may award the Contract to the next lowest responsible and reliable Bidder who shall fulfill every condition precedent to award. A corporation designated as the Apparent Low Bidder shall furnish evidence of its corporate existence and evidence that the officer signing the Contract and bond for the corporation is duly authorized to do so.

23. EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK: The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA", and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.

24. CITY STANDARD PROVISIONS: This contract is subject to the following standard provisions. See The WHITEBOOK for details.

24.1. The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.

24.2. The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.

24.3. The City of San Diego Municipal Code §22.3004 for Contractor Standards.

24.4. The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.

24.5. Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code concerning the employment of apprentices by contractors and subcontractors performing public works contracts.

24.6. The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).

24.7. The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.

25. PRE-AWARD ACTIVITIES:

25.1. The contractor selected by the City to execute a contract for this Work shall submit the required documentation as specified herein and in the Notice of Intent to Award. Failure to provide the information as specified may result in the Bid being rejected as **non-responsive.**

25.2. The decision that bid is non-responsive for failure to provide the information required within the time specified shall be at the sole discretion of the City.

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

Soltek-ECC A Joint Venture, a corporation, as principal, and Liberty Mutual Insurance Company and Hartford Fire Insurance Company, a corporation authorized to do business in the State of California, as Surety, hereby obligate themselves, their successors and assigns, jointly and severally, to The City of San Diego a municipal corporation in the sum of Twenty Million One Hundred Eighty Four Thousand Six Hundred Twenty Three Dollars and Zero Cents ($20,184,623.00) for the faithful performance of the annexed contract, and in the sum of Twenty Million One Hundred Eighty Four Thousand Six Hundred Twenty Three Dollars and Zero Cents ($20,184,623.00) for the benefit of laborers and materialmen designated below.

Conditions:

If the Principal shall faithfully perform the annexed contract with the City of San Diego, California, then the obligation herein with respect to a faithful performance shall be void; otherwise it shall remain in full force.

If the Principal shall promptly pay all persons, firms and corporations furnishing materials for or performing labor in the execution of this contract, and shall pay all amounts due under the California Unemployment Insurance Act then the obligation herein with respect to laborers and materialmen shall be void; otherwise it shall remain in full force.

The obligation herein with respect to laborers and materialmen shall inure to the benefit of all persons, firms and corporations entitled to file claims under the provisions of Article 2. Claimants, (iii) public works of improvement commencing with Civil Code Section 9100 of the Civil Code of the State of California.

Changes in the terms of the annexed contract or specifications accompanying same or referred to therein shall not affect the Surety's obligation on this bond, and the Surety hereby waives notice of same.

The Surety shall pay reasonable attorney's fees should suit be brought to enforce the provisions of this bond.

The Surety expressly agrees that the City of San Diego may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal.

The Surety shall not utilize the Principal in completing the improvements and work specified in the Agreement in the event the City terminates the Principal for default.

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND (continued)

THE CITY OF SAN DIEGO

By: _____

Print Name: Claudia Abarca
Director
Purchasing & Contracting Department

Date: May 9, 2022

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By: _____

Print Name: Dana Fairchild
Deputy City Attorney

Date: 5/12/2022

CONTRACTOR Soltek ECC A Joint Venture

By: _____

Print Name: Stephen W. Thompson, Partner

Date: 3/14/2022

SURETY Liberty Mutual Insurance Company and Hartford Fire Insurance Company

By: _____
Attorney-In-Fact

Print Name: Lawrence F. McMahon

Date: March 3, 2022

Liberty 790 The City Drive South Suite 200 Orange, CA 92868
Hartford: One Pointe Drive, 6th Floor, Brea, CA 92821-2333

Local Address of Surety

Liberty (714) 457-7520
Hartford: (714) 674-1307

Local Phone Number of Surety

$138,131.00
Subject to Adjustment Based on Final Contract Amount
Premium

Liberty Bond No. 024258106
Hartford Bond No. 72BCSIS6511

Bond Number

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Civil Code § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

STATE OF CALIFORNIA }

County of San Diego

On MAR 0 3 2022 (Date) before me, Sarah Myers (Insert Name of Notary exactly as it appears on the official seal), Notary Public,

personally appeared Lawrence F. McMahon (Name(s) of Signer(s)),

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

SARAH MYERS
Notary Public - California
San Diego County
Commission # 2314482
My Comm. Expires Nov 30, 2023

Place Notary Seal Above

Signature _____
Signature of Notary Public Sarah Myers

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of the form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☑ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:
Surety Company

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: 8206895-024019

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Christopher Conte; Dale G. Harshaw; Geoffrey Shelton; Janice Martin; John R. Qualin; Lawrence F. McMahon; Lilia De Leera; Minna Huovila; Natassia Kirk-Smith; Ryan Warnock; Sarah Myers; Tara Bacon

all of the city of San Diego state of CA each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 8th day of December, 2021.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 8th day of December, 2021 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

Commonwealth of Pennsylvania - Notary Seal
Teresa Pastella, Notary Public
Montgomery County
My commission expires March 28, 2025
Commission number 1126044
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12. Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 3rd day of March, 2022.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

For bond and/or Power of Attorney (POA) verification inquiries, please call 610-832-8240 or email HOSUR@libertymutual.com.

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-11
One Hartford Plaza
Hartford, Connecticut 06155
Bond.Claims@thehartford.com
call: 888-266-3488 or fax: 860-757-5835

KNOW ALL PERSONS BY THESE PRESENTS THAT:

Agency Name: ALLIANT INSURANCE SERVICES INC
Agency Code: 72-160200

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of*** Unlimited :

Lilia De Loera, Maria Guise, Janice Martin, Lawrence F. McMahon, Sarah Myers of SAN DIEGO, California

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on May 23, 2016 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Shelby Wiggins

Shelby Wiggins, Assistant Secretary

Joelle L. LaPierre

Joelle L. LaPierre, Assistant Vice President

STATE OF FLORIDA
COUNTY OF SEMINOLE } ss. Lake Mary

On this 20th day of May, 2021, before me personally came Joelle LaPierre, to me known, who being by me duly sworn, did depose and say: that (s)he resides in Seminole County, State of Florida; that (s)he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that (s)he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that (s)he signed his/her name thereto by like authority.

Jessica Ciccone

Jessica Ciccone
My Commission HH 122280
Expires June 20, 2025

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of March 3, 2022.

Signed and sealed in Lake Mary, Florida.

Keith D. Dozois

Keith D. Dozois, Assistant Vice President

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of SAN DIEGO }

On MARCH 14, 2022 before me, ANGELINA S. ADAPON
Date *Here Insert Name and Title of the Officer*

personally appeared STEPHEN W. THOMPSON
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ANGELINA S. ADAPON
COMM. #2322690
NOTARY PUBLIC • CALIFORNIA
SAN DIEGO COUNTY
Commission Expires: FEB 29, 2024

Place Notary Seal and/or Stamp Above

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
Signature of Notary Public

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: PERFORMANCE, LABOR + MATERIALMEN'S BOND
Document Date: 3/11/22 Number of Pages: 6
Signer(s) Other Than Named Above: N/A

Capacity(ies) Claimed by Signer(s)

Signer's Name:	Signer's Name:
☐ Corporate Officer – Title(s):	☐ Corporate Officer – Title(s):
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing:	Signer is Representing:

ATTACHMENTS

ATTACHMENT A

SCOPE OF WORK

SCOPE OF WORK

1. **SCOPE OF WORK:** New approximately 18,000 square foot branch library facility on a 1.5 acres site in Pacific Highlands Ranch. The design for this facility includes but is not limited to: Children and Teen areas, several study rooms, a computer area, community meeting room with a catering kitchen, Friends of the Library Room, and patios off the library.

1.1. The Work shall be performed in accordance with:

1.1.1. The Notice Inviting Bids and Plans numbered **41607-01-D** through **41607-312-D**, inclusive.

2. **LOCATION OF WORK:** The location of the Work is as follows:

12911 Pacific Place
San Diego, CA 92130

See **Appendix E – Location Map**

3. **CONTRACT TIME:** The Contract Time for completion of the Work, including the Plant Establishment Period, shall be **484 Working Days**.

ATTACHMENT B

RESERVED

ATTACHMENT C

RESERVED

ATTACHMENT D

PREVAILING WAGE

PREVAILING WAGE

1. **PREVAILING WAGE RATES:** Pursuant to San Diego Municipal Code section 22.3019, construction, alteration, demolition, repair and maintenance work performed under this Contract is subject to State prevailing wage laws. For construction work performed under this Contract cumulatively exceeding $25,000 and for alteration, demolition, repair and maintenance work performed under this Contract cumulatively exceeding $15,000, the Contractor and its subcontractors shall comply with State prevailing wage laws including, but not limited to, the requirements listed below.

   1.1. Compliance with Prevailing Wage Requirements. Pursuant to sections 1720 through 1861 of the California Labor Code, the Contractor and its subcontractors shall ensure that all workers who perform work under this Contract are paid not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). This includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work.

      1.1.1. Copies of such prevailing rate of per diem wages are on file at the City and are available for inspection to any interested party on request. Copies of the prevailing rate of per diem wages also may be found at http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm. Contractor and its subcontractors shall post a copy of the prevailing rate of per diem wages determination at each job site and shall make them available to any interested party upon request.

      1.1.2. The wage rates determined by the DIR refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, then the published rate of wage shall be in effect for the life of this Contract. If the published wage rate refers to a predetermined wage rate to become effective upon expiration of the published wage rate and the predetermined wage rate is on file with the DIR, such predetermined wage rate shall become effective on the date following the expiration date and shall apply to this Contract in the same manner as if it had been published in said publication. If the predetermined wage rate refers to one or more additional expiration dates with additional predetermined wage rates, which expiration dates occur during the life of this Contract, each successive predetermined wage rate shall apply to this Contract on the date following the expiration date of the previous wage rate. If the last of such predetermined wage rates expires during the life of this Contract, such wage rate shall apply to the balance of the Contract.

   1.2. Penalties for Violations. Contractor and its subcontractors shall comply with California Labor Code section 1775 in the event a worker is paid less than the prevailing wage rate for the work or craft in which the worker is employed. This shall be in addition to any other applicable penalties allowed under Labor Code sections 1720 – 1861.

   1.3. Payroll Records. Contractor and its subcontractors shall comply with California Labor Code section 1776, which generally requires keeping accurate payroll records, verifying and certifying payroll records, and making them available for inspection. Contractor shall require its subcontractors to also comply with section 1776. Contractor and its subcontractors shall submit weekly certified payroll records online via the City's web-based Labor Compliance Program. Contractor is responsible for ensuring its subcontractors submit certified payroll records to the City.

1.3.1. Contractor and their subcontractors shall also furnish records specified in Labor Code section 1776 directly to the Labor Commissioner in the manner required by Labor Code section 1771.4.

1.4. **Apprentices.** Contractor and its subcontractors shall comply with California Labor Code sections 1777.5, 1777.6 and 1777.7 concerning the employment and wages of apprentices. Contractor is held responsible for the compliance of their subcontractors with sections 1777.5, 1777.6 and 1777.7.

1.5. **Working Hours.** Contractor and their subcontractors shall comply with California Labor Code sections 1810 through 1815, including but not limited to: (i) restrict working hours on public works contracts to eight hours a day and forty hours a week, unless all hours worked in excess of 8 hours per day are compensated at not less than 1½ times the basic rate of pay; and (ii) specify penalties to be imposed on contractors and subcontractors of $25 per worker per day for each day the worker works more than 8 hours per day and 40 hours per week in violation of California Labor Code sections1810 through 1815.

1.6. **Required Provisions for Subcontracts.** Contractor shall include at a minimum a copy of the following provisions in any contract they enter into with a subcontractor: California Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860 and 1861.

1.7. **Labor Code Section 1861 Certification.** Contractor in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractor certifies that "I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."

1.8. **Labor Compliance Program**. The City has its own Labor Compliance Program authorized in August 2011 by the DIR. The City will withhold contract payments when payroll records are delinquent or deemed inadequate by the City or other governmental entity, or it has been established after an investigation by the City or other governmental entity that underpayment(s) have occurred. For questions or assistance, please contact the City of San Diego's Prevailing Wage Unit at 858-627-3200.

1.9. **Contractor and Subcontractor Registration Requirements.** This project is subject to compliance monitoring and enforcement by the DIR. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid or proposal, subject to the requirements of section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5 It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

1.9.1. A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to

bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

1.9.2. By submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration for themselves and all listed subcontractors to the City at the time of bid or proposal due date or upon request.

1.10. **Stop Order.** For Contractor or its subcontractors engaging in the performance of any public work contract without having been registered in violation of Labor Code sections 1725.5 or 1771.1, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractors or unregistered subcontractor(s) on ALL public works until the unregistered contractor or unregistered subcontractor(s) is registered. Failure to observe a stop order is a misdemeanor.

1.11. **List of all Subcontractors.** The Contractor shall provide the list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Contract prior to any work being performed; and the Contractor shall provide a complete list of all subcontractors with each invoice. Additionally, Contractor shall provide the City with a complete list of all subcontractors (regardless of tier) utilized on this contract within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Construction Management Professional until at least thirty (30) days after this information is provided to the City.

1.12. **Exemptions for Small Projects.** There are limited exemptions for installation, alteration, demolition, or repair work done on projects of $25,000 or less. The Contractor shall still comply with Labor Code sections 1720 et. seq. The only recognized exemptions are listed below:

1.12.1. Registration. The Contractor will not be required to register with the DIR for small projects. (Labor Code section 1771.1).

1.12.2. Certified Payroll Records. The records required in Labor Code section 1776 shall be required to be kept and submitted to the City of San Diego, but will not be required to be submitted online with the DIR directly. The Contractor will need to keep those records for at least three years following the completion of the Contract. (Labor Code section 1771.4).

1.12.3. List of all Subcontractors. The Contractor shall not be required to hire only registered subcontractors and is exempt from submitting the list of all subcontractors that is required in section 1.11 above. (Labor code section 1773.3).

ATTACHMENT E

SUPPLEMENTARY SPECIAL PROVISIONS

SUPPLEMENTARY SPECIAL PROVISIONS

The following Supplementary Special Provisions (SSP) modifies the following documents:

1. The **2018 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
2. The **2018 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
   a) General Provisions (A) for all Construction Contracts.

PART 0 – EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP)

SECTION A – GENERAL REQUIREMENTS

0-12 CONTRACT RECORDS AND REPORTS. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall maintain records of all subcontracts and invoices from your Subcontractors and Suppliers for work on this project. Records shall show name, telephone number including area code, and business address of each Subcontractor, Supplier, and joint venture partner, and the total amount actually paid to each firm. Project relevant records, regardless of tier, may be periodically reviewed by the City.
2. You shall retain all records, books, papers, and documents pertinent to the Contract for a period of not less than 5 years after Notice of Completion and allow access to said records by the City's authorized representatives.
3. You shall submit the following reports using the City's web-based contract compliance (Prism® portal):
   a) **Monthly Payment.** You shall submit Monthly Payment Reporting by the 10th day of the subsequent month. Incomplete and/or delinquent reporting may cause payment delays, non-payment of invoices, or both.
4. The records maintained under item 1, described above, shall be consolidated into a Final Summary Report, certified as correct by an authorized representative of the Contractor. The Final Summary Report shall include all subcontracting activities and be sent to the EOCP Program Manager prior to Acceptance. Failure to comply may result in assessment of liquidated damages or withholding of retention. The City will review and verify 100% of subcontract participation reported in the Final Summary Report prior to approval and release of final retention to you. In the event your Subcontractors are owed money for completed Work, the City may authorize payment to subcontractor via a joint check from the withheld retention.

SECTION 1 – GENERAL, TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS. To the "WHITEBOOK", items 43, 56, 69, and 102, DELETE in their entirety and SUBSTITUTE with the following:

43. **Field Order** - A Field Order is a written agreement by the Engineer to compensate you for Work items in accordance with 2-8, "EXTRA WORK" or 2-9, "CHANGED CONDITIONS". A Field Order does not change the Contract Price, Contract Time, or the scope intent of the Contract. The unused portion of the Field Order shall revert to the City upon Acceptance.

56. **Notice of Completion (NOC)** - A document recorded with the County of San Diego to signify that the Contract Work has been completed and accepted by the City.

69. **Punchlist** - A list of items of Work or corrections generated after a Walk-through that is conducted when you consider that the Work and Services are complete, and as verified by the Owner. The Punchlist may be completed in phases if defined in the Contract.

102. **Walk-through** - An inspection the City uses to verify the completion of the Project or phase of the Project and to generate a Punchlist prior to Acceptance.

To the "WHITEBOOK", item 54, "Normal Working Hours", ADD the following:

The **Normal Working Hours** are **7:00 AM** to **3:30 PM**.

To the "WHITEBOOK", ADD the following:

108. **Acceptance** – When all of the Contract Work, including all Punchlist items, is deemed officially complete by the City Asset Owning Department or Deputy City Engineer.

109. **Occupancy** – When the Owner deems a building is ready for use, the Owner will issue a certificate of Occupancy in writing.

110. **Substantial Completion** – When all Contract Work is deemed complete by the Contractor in writing, and as verified by the Owner. Substantial Completion may be completed in phases if defined in the Contract.

1-7.1.3 Requests for Information (RFI). To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Should You discover a conflict, omission, errors in the Contract Documents, differences with existing field conditions, or have any questions concerning interpretation or clarification of Contract Documents, or when you propose deviations to the standards or design, you shall submit a Request for Information (RFI) to the City regarding your question or clarification within **1 Working Day**.

2. Your RFI shall meet the following requirements:

   a) All RFIs, whether by You or your Subcontractor or supplier at any tier, shall be submitted by You to the City.

   b) RFIs shall be numbered sequentially.

   c) You shall clearly and concisely set forth the single issue for which interpretation or clarification is sought, indicate Specification Section numbers, Contract Drawing numbers, and details, or other items involved, and state why a response is required from the City.

   d) RFIs shall be submitted within **1 Working Day** in order that they may be adequately researched and answered before the response affects any critical activity of the Work.

   e) Should You believe that a response to an RFI causes a change to the requirements of the Contract, You shall, before proceeding, give written notice to the City, indicating that You believe that City response to the RFI to be a Change Order. Failure to give such written notice within **5 Working Days** of receipt of the City's response to the RFI shall waive Your right to seek additional time or cost.

3. The City will respond to RFIs within **5 Working Days** unless the City notifies You in writing that a response will take longer. The **5 Working Days** shall begin when the RFI is received and dated by the City. Responses from the City will not change any requirement of the Contract unless so noted by the City in the response to the RFI. The City will not issue a Change Order for Extra Work or additional time when the issue raised in the RFI was due to your fault, neglect, or any unauthorized deviations from the project design or specifications.

4. If You proceed in resolving a conflict, omission, or any error in the Contract Documents without sending the City an RFI in accordance with the requirements stated above, the City may require You to remove such work at Your cost or back charge You the cost to remove this work.

1-7.2 **Contract Bonds.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Before execution of the Contract, file payment and performance bonds with the City to be approved by the Board in the amounts and for the purposes noted. Bonds shall be executed by a responsible surety as follows:

   a) If the Work is being funded with state or local money, consistent with California Code of Civil Procedure §995.670, the Surety shall be an "admitted surety" authorized by the State of California Department of Insurance to transact surety insurance in the State.

   b) If the Work is being funded with federal money, the Surety shall be listed in the U.S. Treasury Department Circular 570 and shall be in conformance with the specified Underwriting Limitations.

To the "WHITEBOOK", item 2, subsection "a", subsection "i", DELETE in its entirety and SUBSTITUTE with the following:

i. A "Payment Bond" (Materials and Labor Bond) is optional. If no bond is submitted, no payment shall be made until 35 Calendar Days after Acceptance and any lien requirements have been fulfilled. If a bond is submitted, progress payments shall be made in accordance with these Specifications.

To the "WHITEBOOK", item 2, subsection "d", DELETE in its entirety and SUBSTITUTE with the following:

d) For Contracts over $100,000:

i. A "Payment Bond" (Materials and Labor Bond) for 100% of the Contract Price to satisfy claims of material Suppliers and of mechanics and laborers employed on the Work. You shall maintain the bond in full force and effect until Acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.

ii. A "Faithful Performance Bond" for 100% of the Contract Price to guarantee faithful performance of Work, within the time prescribed and in a manner satisfactory to the City, that materials and workmanship shall be free from original or developed defects.

To the "WHITEBOOK", item 7, DELETE in its entirety and SUBSTITUTE with the following:

7. You shall require the Surety to mail its standard "Bond Status" form to the Engineer at the following address:

Deputy Director
Construction Management and Field Engineering Division
9573 Chesapeake Drive San Diego, CA 92123

SECTION 2 - SCOPE OF THE WORK

2-2.3 **Payment.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. The payment for procuring Building Permits and Utility fees that include costs associated with dry utilities fees but not limited to SDG&E service orders, as well as wet utilities including water and sewer connection fees shall be included in the Allowance Bid item for "Building Permits and Utility Fees (EOC Type I)".

SECTION 3 – CONTROL OF THE WORK

3-2 **SELF-PERFORMANCE.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The self-performance percentage requirement will be waived for Prime Contractors meeting the Class B License requirement of this Contract.

3-3 SUBCONTRACTORS. To the "WHITEBOOK", ADD the following:

6. When a Subcontractor fails to prosecute a portion of the Work in a manner satisfactory to the City, you shall remove such Subcontractor immediately upon written request of the City, and shall request approval of a replacement Subcontractor to perform the Work in accordance with California Public Contract Code (PCC), Subletting and Subcontracting, Section 4107, at no added cost to the City.

3-9 TECHNICAL STUDIES AND SUBSURFACE DATA. To the "WHITEBOOK", ADD the following:

5. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests at the Work Site:

   a) Preliminary Geotechnical Investigation, dated Dec. 3, 2019 by Christian Wheeler Engineering.

   b) Drainage Study Addendum, dated Mar. 23, 2020, by Latitude 33 Planning and Engineering

6. The reports listed above are available for review at the following link:

   https://drive.google.com/drive/folders/1BzWbh1MeI-d2HjavS8EDvrsnQXtcgkcL

3-10 SURVEYING. To the "GREENBOOK" and "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

3-10 SURVEYING (DESIGN-BID-BUILD).

3-10.1 General.

1. You shall provide all required site layout and general grade checking work not specified in 3-10.2, "Survey Services Provided by City".
2. Notify the City, in writing, at least 2 Working Days prior to requesting survey services provided by the City.

3-10.2 Survey Services Provided by City.

1. Unless otherwise noted, monument perpetuation, including mark-outs, will be performed by the City. Coordination of these services will be your duty, through the Resident Engineer. If, at any time, an existing survey monument is, or will be, destroyed or disturbed during the course of construction you shall notify the Resident Engineer so that the monument is preserved or perpetuated in accordance with state law.
2. The following surveying services, as defined in Cal. Bus. & Prof. Code §8726, shall be provided by the City:

   a) Locating or establishing a minimum of 4 project geodetic survey control points that provide horizontal and vertical reference values for site feature and structure layout reference locations.

b) Locating, establishing, or reestablishing project site boundary lines, survey monuments, right-of-way lines, or easement lines.

c) Locating or establishing building design structure locations (building corners or envelope limits) sufficient for structure construction.

3-10.3 Payment.

1. The payment for site layout and general grade checking Work, coordination, and preservation of all survey related marks shall be included in the Contract Price.

3-13.1 Completion. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall submit a written assertion that the Work has been completed and is ready for Owner Acceptance. If, in the Engineer's judgment, the Work has been completed in accordance with the Contract Documents, the Engineer will set forth in writing the date the Work was completed. This will be the date that you are relieved from responsibility to protect and maintain the Work and to which liquidated damages will be computed.

3-13.1.1 Requirements Before Requesting a Walk-through. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

3-13.1.1 Requirements Before Requesting Substantial Completion.

1. The following items are required prior to requesting a Substantial Completion:

a) Remove temporary facilities from the Site.

b) Thoroughly cleaning the Site and removing all mark outs and construction staking.

c) Provide completed and signed Red-lines in accordance with 3-7.3 "Redlines and Record Documents".

d) Provide all material and equipment maintenance and operation instructions and/or manuals.

e) Provide all tools which are permanent parts of the equipment installed in the Project.

f) Provide and properly identify all keys for construction and all keys for permanent Work.

g) Provide all final Special Inspection reports required by the applicable building Code.

h) Provide all items specified to be supplied as extra stock. Wrap, seal, or place in a container all items as necessary to allow for storage by the City for future use. Verify the specified quantities.

i) Ensure that all specified EOCP and certified wage rate documentations covering the Contract Time have been submitted.

j) Provide the spare parts for the proposed irrigation system as specified in the Special Provisions.

k) If the Work includes sewer and storm drain installations, the inspection shall include televising in accordance with 306-18, "VIDEO INSPECTION".

l) If the Work includes a Plant Establishment Period, Work in accordance with 801-6, "MAINTENANCE AND PLANT ESTABLISHMENT" shall be completed prior to requesting Substantial Completion, unless approved otherwise by the Owner.

m) Notify the Engineer to arrange a final inspection of permanent BMPs installed.

3-13.1.2 Walk-through and Punchlist Procedure. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall notify the Engineer 15 Working Days in advance of date of anticipated Substantial Completion to allow time for Engineer to schedule a Walk-through.

2. After you complete the requirements in 3-13.1.1, "Requirements Before Requesting Substantial Completion" and when you consider that the Work is Substantially Complete, you will notify the Engineer in writing that the Project is Substantially Complete and request a Walk-through. The Engineer will review your request and determine if the Project is ready for a Walk-through, by verifying whether you have completed all items as required by 3-13.1.1, "Requirements Before Requesting Substantial Completion". Within 7 Working Days, the City will either reject your request for a Walk-through in writing or schedule and conduct a Walk-through inspection. The Engineer shall facilitate the Walk-through.

3. The following documents shall be provided at the time of your Walk-through request: As-Built markup, Plans, specifications, technical data such as submittals and equipment manuals, draft final payment, warranties, material certifications, bonds, guarantees, maintenance service agreements, and maintenance and operating manuals.

4. Written warranties, except manufacturer's standard printed warranties, shall be on a letterhead addressed to you. Warranties shall be submitted in the format described in this section, modified as approved by the City, to suit the conditions pertaining to the warranty. Lack of submitting these items will delay start of Walk-through.

5. The Engineer will provide you with the Punchlist within 15 Working Days after the date of the Walk-through. The City shall not provide a preliminary Punchlist.

6. If the Engineer finds that the Project is not Substantially Complete as defined herein, the Engineer will terminate the Walk-through and notify you in writing.

7. If, at any time during the Engineer's evaluation of the corrective Work required by the Punchlist, the Engineer discovers that additional corrective Work is required, the Engineer may include that corrective Work in the Punchlist.

8. You shall remain solely responsible for the Project Site until the Project is completely operational, all Punchlist items have been corrected, all operation and maintenance manuals have been approved, all necessary warranty letters have been received, and the work is formally accepted by the City.

9. The Engineer shall meet with you within 5 Working Days of notification that all Punchlist items are corrected. You shall complete the Punchlist within 30 Working Days, and Working Days will continue to be counted until Acceptance of the Project.

3-13.2 **Acceptance.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall provide the completed, signed, and stamped DS-563 to the Engineer prior to Acceptance.

2. You shall deliver the final As-builts and final billing prior to Acceptance.

3. You shall assemble and deliver to the Engineer a Final Summary Report and Affidavit of Disposal prior to Acceptance.

4. Acceptance shall occur after all of the requirements contained in the Contract Documents have been fulfilled. If, in the Engineer's judgment, you have fully performed the Contract, the Engineer will recommend to the City Engineer that your performance of the Contract be accepted. You shall receive notification of Acceptance in writing from the Owner and counting of working days shall cease and Warranty begins.

5. Retention can be released 35 Calendar Days after NOC. Submit your request for retention to the Resident Engineer and they will mail to you a "Release of Claims" form which shall be completed and returned before the retention will be released.

3-13.3 **Warranty.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall warranty and repair all defective materials and workmanship for a period of 1 year. This call back warranty period shall start on the date the Work was accepted by the City unless the City has Beneficial Use or takes Occupancy of the project earlier (excluding water, sewer, and storm drain projects).

2. You shall warranty the Work free from all latent defects for 10 years and patent defects for a period of 4 years.

3. The warranty period for specific items covered under manufacturers' or suppliers' warranties shall commence on the date they are placed into service at the direction of the Engineer in writing.

4. All express warranties from Subcontractors, manufacturers', or Suppliers', of any tier, for the materials furnished and Work performed shall be assigned, in writing, to the City, and shall be delivered to the Engineer prior to the Acceptance of your performance of the Contract.

5. Replace or repair defective materials and workmanship in a manner satisfactory to the Engineer after notice to do so from the Engineer and within the time specified in the notice. If you fail to make such replacements or repairs within the time specified in the notice, the City may perform the replacement or repairs at your expense. If you fail to reimburse the City for the actual costs, your Surety shall be liable for the cost.

6. Items that shall be warrantied free from defective workmanship and materials for a period longer than 1 year are as follows:

Specified Item	Minimum Warranty Period
Detectable Warning Tile Construction	3 Years of Manufacturer's Warranty
All Work Under SECTION 500 – PIPELINE REHABILITATION	3 Years
Fiber Optic Interconnect Cables	2 Years
Luminaires*	10 Years of Manufacturer's Warranty
LED Signal Modules	3 Years of Manufacturer's Warranty
Field Devices Associated with 700-6.3, "Adaptive Control Note"	See 700-6.3.9, "Warranty"

* Provide documentation verifying that the induction luminaire models being offered for the Project are covered by the 10-year warranty.

7. You shall provide the City and property owner a copy of the manufacturer's warranty for private sewer pumps, including the alarm panel and all other accessories.

   a) You shall involve the manufacturer in the installation and startup as needed to secure any extended warranty required.

   b) Nothing in here is intended to limit any manufacturer's warranty which provides the City with greater warranty rights than set forth in this section or the Contract Documents.

   c) The warranty shall include all components. The form of the warranty shall be approved by the Engineer in accordance with 3-13.3.2, "Warranty Format Requirements".

8. If, during the warranty period, any item of the Work is found to be Defective Work, you shall correct it promptly after receipt of written notice from the City

to do so. The warranty period shall be extended with respect to portions of the Work corrected as part of the warranty requirements.

3-13.3.1 **Defective Work.** To the "WHITEBOOK", item 6, DELETE in its entirety and SUBSTITUTE with the following:

6. For Building Projects which require a certificate of occupancy, not including sewer and water facilities, if you fail to correct the defective Work listed on the City's Punchlist within 30 Working Days after the Contract Time, you shall reimburse the City for all costs to provide inspection services required to monitor Work beyond the 30 Working Days. The City shall bill you for the additional inspection at the City's established rates.

3-14 **FORMAL PARTNERING.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

Formal partnering workshops will be part of this project, Refer to **Appendix H** - **Standard Partnering Specification - Vertical Construction Partnering Level 2** for additional information.

3-14.1 **Payment.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

A. The (Owner/Owner's Rep) shall agree to pay

1. 50% of cost for:
   a. facilitator workshops and sessions based costs
   b. monthly partnering evaluation survey service cost
2. Contractor shall agree to pay 50% of all partnering cost included as part of their lump sum.

B. Payment amount shall be based on invoice prices minus any available or offered discount. (Owner/Owner's Rep) shall not pay markup on these costs.

C. Payment amount shall be included with the Lump Sum Bid Item "Construction of Pacific Highlands Ranch Branch Library" referred in SSP 7-3-1 and **Appendix H** - **Standard Partnering Specification - Vertical Construction Partnering Level 2**, "**Section 4 – Partnering Payment".**

SECTION 4 - CONTROL OF MATERIALS

ADD:

4-3.4 **Specialty Inspection Paid for by the Contractor.** To the "WHITEBOOK", ADD the following:

7. The specialty inspections required are listed as follows:
   1. Concrete
   2. Structural that includes steel, welding anchors, and rebars.
   3. Soil compaction

4-3.4.1 Payment. To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. The payment for specialty inspection service work shall be included under the bid item for "Construction of Pacific Highlands Ranch Branch Library."

4-3.6 **Preapproved Materials.** To the "WHITEBOOK", ADD the following:

3. You shall submit in writing a list of all products to be incorporated in the Work that are on the AML.

4-6 **TRADE NAMES.** To the "WHITEBOOK", ADD the following:

11. You shall submit your list of proposed substitutions for an "equal" item **no later than 5 Working Days after the determination of the Apparent Low Bidder** and on the City's Product Submittal Form available at:

    http://www.sandiego.gov/ecp/edocref/index.shtml

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

5-4 **INSURANCE.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

5-4 **INSURANCE.**

1. The insurance provisions herein shall not be construed to limit your indemnity obligations contained in the Contract.

5-4.1 **Policies and Procedures.**

1. You shall procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by you, your agents, representatives, officers, employees or Subcontractors.

2. Insurance coverage for property damage resulting from your operations is on a replacement cost valuation. The market value will not be accepted.

3. You shall maintain this insurance for the duration of this Contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this Contract. Your liabilities under the Contract, e.g., your indemnity obligations, is not deemed limited to the insurance coverage required by this Contract.

4. The payment for insurance shall be included in the Contract Price as bid by you. Except as specifically agreed to by the City in writing, you are not entitled to any additional payment. Do not begin any Work under this Contract until you have provided and the City has approved all required insurance.

5. Policies of insurance shall provide that the City is entitled to 30 Days (10 Days for cancellation due to non-payment of premium) prior written notice of

cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

5-4.2 Types of Insurance.

5-4.2.1 Commercial General Liability Insurance.

1. Commercial General Liability Insurance shall be written on the current version of the ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad.

2. The policy shall cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract).

3. There shall be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You shall maintain the same or equivalent insurance for at least 10 years following completion of the Work.

4. All costs of defense shall be outside the policy limits. Policy coverage shall be in liability limits of not less than the following:

General Annual Aggregate Limit	Limits of Liability
Other than Products/Completed Operations	$2,000,000
Products/Completed Operations Aggregate Limit	$2,000,000
Personal Injury Limit	$1,000,000
Each Occurrence	$1,000,000

5-4.2.2 Commercial Automobile Liability Insurance.

1. You shall provide a policy or policies of Commercial Automobile Liability Insurance written on the current version of the ISO form CA 00 01 12 90 or later version or equivalent form providing coverage at least as broad in the amount of $1,000,000 combined single limit per accident, covering bodily injury and property damage for owned, non-owned, and hired automobiles ("Any Auto").

2. All costs of defense shall be outside the limits of the policy.

5-4.2.5 Contractors Builders Risk Property Insurance.

1. You shall provide at your expense, and maintain until Final Acceptance of the Work, a Special Form Builders Risk Policy or Policies. This insurance shall be in an amount equal to the replacement cost of the completed Work (without deduction for depreciation) including the cost of excavations, grading, and filling. The policy or policies limits shall be 100% of this Contract value of the Work plus 15% to cover administrative costs, design costs, and the costs of inspections and construction management.

2. Insured property shall include material or portions of the Work located away from the Site but intended for use at the Site and shall cover material or portions of the Work in transit. The policy or policies shall include as insured property scaffolding, falsework, and temporary buildings located at the Site. The policy or policies shall cover the cost of removing debris, including demolition.

3. The policy or policies shall provide that all proceeds thereunder shall be payable to the City as Trustee for the insured, and shall name the City, the Contractor, Subcontractors, and Suppliers of all tiers as named insured. The City, as Trustee, will collect, adjust, and receive all monies which may become due and payable under the policy or policies, may compromise any and all claims thereunder, and will apply the proceeds of such insurance to the repair, reconstruction, or replacement of the Work.

4. Any deductible applicable to the insurance shall be identified in the policy or policies documents and responsibility for paying the part of any loss not covered because of the application of such deductibles shall be apportioned among the parties except for the City as follows: if there is more than one claimant for a single occurrence, then each claimant shall pay a pro-rata share of the per occurrence deductible based upon the percentage of their paid claim to the total paid for insured. The City shall be entitled to 100% of its loss. You shall pay the City any portion of that loss not covered because of a deductible at the same time the proceeds of the insurance are paid to the City as trustee.

5. Any insured, other than the City, making claim to which a deductible applies shall be responsible for 100% of the loss not insured because of the deductible. Except as provided for under California law, the policy or policies shall provide that the City is entitled to 30 Days prior written notice (10 Days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

5-4.3 **Rating Requirements.** Except for the State Compensation Insurance Fund, all insurance required by this Contract as described herein shall be carried only by responsible insurance companies with a rating of, or equivalent to, at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

5-4.3.1 **Non-Admitted Carriers.** The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Approved Surplus Lines Insurers (LASLI list).

All policies of insurance carried by non-admitted carriers shall be subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

5-4.4 **Evidence of Insurance.** Furnish to the City documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and furnish renewal documentation prior to expiration of this insurance. Each required document shall be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. We reserve the right to require complete, certified copies of all insurance policies required herein.

5-4.5 Policy Endorsements.

5-4.5.1 Commercial General Liability Insurance.

5-4.5.1.1 Additional Insured.

1. You shall provide at your expense policy endorsement written on the current version of the ISO Occurrence form CG 20 10 11 85 or an equivalent form providing coverage at least as broad.
2. To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured.
3. The additional insured coverage for projects for which the Engineer's Estimate is $1,000,000 or more shall include liability arising out of:

    a) Ongoing operations performed by you or on your behalf,

    b) your products,

    c) your Work, e.g., your completed operations performed by you or on your behalf, or

    d) premises owned, leased, controlled, or used by you.

4. The additional insured coverage for projects for which the Engineer's Estimate is less than $1,000,000 shall include liability arising out of:

    a) Ongoing operations performed by you or on your behalf,

    b) your products, or

    c) premises owned, leased, controlled, or used by you.

5-4.5.1.2 Primary and Non-Contributory Coverage. The policy shall be endorsed to provide that the coverage with respect to operations, including the completed operations, if appropriate, of the Named Insured is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives. Further, it shall provide that any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of your insurance and shall not contribute to it.

5-4.5.1.3 Project General Aggregate Limit. The policy or policies shall be endorsed to provide a Designated Construction Project General Aggregate Limit that will apply only to the Work. Only claims payments which arise from the Work shall reduce the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit shall be in addition to the aggregate limit provided for the products-completed operations hazard.

5-4.5.2 Commercial Automobile Liability Insurance.

5-4.5.2.1 Additional Insured. Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured, with respect to liability arising out of automobiles owned, leased, hired or borrowed by you or on your behalf. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

5-4.5.5 Builders Risk Endorsements.

5-4.5.5.1 Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City, and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from Work performed by the Named Insured for the City.

5-4.5.5.2 Builders Risk – Partial Utilization. If the City desires to occupy or use a portion or portions of the Work prior to Acceptance in accordance with this Contract, the City will notify you and you shall immediately notify your Builder's Risk insurer and obtain an endorsement that the policy or policies shall not be cancelled or lapse on account of any such partial use or occupancy. You shall obtain the endorsement prior to the City's occupation and use.

5-4.6 Deductibles and Self-Insured Retentions. You shall pay for all deductibles and self-insured retentions. You shall disclose deductibles and self-insured retentions to the City at the time the evidence of insurance is provided.

5-4.7 Reservation of Rights. The City reserves the right, from time to time, to review your insurance coverage, limits, deductibles and self-insured retentions to determine if they are acceptable to the City. The City will reimburse you, without overhead, profit, or any other markup, for the cost of additional premium for any coverage requested by the Engineer but not required by this Contract.

5-4.8 Notice of Changes to Insurance. You shall notify the City 30 Days prior to any material change to the policies of insurance provided under this Contract.

5-4.9 Excess Insurance. Policies providing excess coverage shall follow the form of the primary policy or policies e.g., all endorsements.

5-4.10 Architects and Engineers Professional Insurance (Errors and Omissions Insurance).

1. For Contracts with required engineering services (e.g., Design-Build, preparation of engineered Traffic Control Plans (TCP), and etc.) by you, you shall keep or require all of your employees or Subcontractors, who provide professional engineering services under this contract, Professional Liability coverage with a limit of $**1,000,000** per claim and $**2,000,000** annual aggregate in full force and effect.

2. You shall ensure the following:

   a) The policy retroactive date is on or before the date of commencement of the Project.

   b) The policy will be maintained in force for a period of 3 years after completion of the Project or termination of this Contract, whichever occurs last. You agree that for the time period specified above, there will be no changes or endorsements to the policy that affect the specified coverage.

3. If professional engineering services are to be provided solely by the Subcontractor, you shall:

   a) Certify this to the City in writing and

   b) Agree in writing to require the Subcontractor to procure Professional Liability coverage in accordance with the requirements set forth above.

5-4.11 Workers' Compensation Insurance and Employers Liability Insurance.

1. In accordance with the provisions of §3700 of the California Labor Code, you shall provide at your expense Workers' Compensation Insurance and Employers Liability Insurance to protect you against all claims under applicable state workers compensation laws. The City, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by your failure to comply with the requirements of this section.

2. Limits for this insurance shall be not less than the following:

Workers' Compensation	Statutory Employers Liability
Bodily Injury by Accident	$1,000,000 each accident
Bodily Injury by Disease	$1,000,000 each employee
Bodily Injury by Disease	$1,000,000 policy limit

3. By signing and returning the Contract you certify that you are aware of the provisions of §3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code and you shall comply with such provisions before commencing the Work as required by §1861 of the California Labor Code.

5-4.11.1 Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from Work performed by the Named Insured for the City.

ADD:

5-10.2.1 **Public Notice by Contractor.** To the "WHITEBOOK", items 2 and 3, DELETE in their entirety and SUBSTITUTE with the following:

2. No less than 5 Working Days in advance of Project construction activities and utility service interruptions, you shall notify all critical facilities, businesses, institutions, property owners, residents, or any other impacted stakeholders within a minimum 300-foot (90 m) radius of the Project. Verbal and written notifications shall be sent to critical facilities (including but not limited to police stations, fire stations, hospitals, and schools). A copy of written notifications sent to any critical facility shall also be sent to the Resident Engineer. You shall keep records of the people contacted, along with the dates of notification, and shall provide the record to the Engineer upon request. You shall identify all other critical facilities that need to be notified.

3. Furnish and distribute public notices in the form of door hangers using the City's format to all occupants and/or property owners along streets:

   a) Where Work is to be performed at least Working 5 Working Days before starting construction or survey activities or impacting the community as approved by the Resident Engineer.

   b) Within 5 Working Days of the completion of your construction activities where Work was performed, you shall distribute public notices in the form of door hangers, which outlines the anticipated dates of Asphalt Resurfacing or Slurry Seal.

   c) 72 hours in advance of the scheduled resurfacing.

5-13 **ELECTRONIC COMMUNICATION.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Virtual Project Manager shall be used on this Contract.

2. You shall post all communications addressed to the Engineer concerning construction including RFIs, submittals, daily logs including the Weekly Statement of Working Days (WSWD), Storm Water, and transmittals to the Virtual Project Manager (VPM) website established for the Projects. This shall not supersede any Federal requirements.

3. Maintain a list of scheduled activities including planned and actual execution dates for all major construction activities and milestones defined in the approved Schedule.

4. Review and act on all communications addressed to you in the VPM project website.

5. A user's guide to the VPM system is available on the City's website and shall be provided to you at the Pre-construction Meeting. Refer to the VPM training videos and forms at the location below:

   https://www.sandiego.gov/ecp/edocref

6. Submit the Sensitive Information Authorization Acknowledgement Form and VPM User Agreement located in the VPM user's guide at the Pre-construction Meeting.

5-15.1 **General.** To the "WHITEBOOK", item 10, DELETE in its entirety and SUBSTITUTE with the following:

10. If your construction activities have encountered flammable liquids or other hazardous substances, you shall ensure that construction staff have the required Hazardous Waste Operations and Emergency Response (HAZWOPER) certification. Construction staff shall include: City Engineers, City Laboratory Technicians, and City staff that perform onsite inspections.

    a) If your Work encounters flammable liquids or other hazardous substances, you shall be responsible for scheduling training for all construction staff to attend and for submitting verification to the Engineer that construction staff have the required HAZWOPER certification prior to continuing that Work in that area. You shall maintain the HAZWOPER certifications annually until the construction activities triggering the requirement is complete, as approved by the Resident Engineer.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

6-1.1 **Construction Schedule.** To the "GREENBOOK", paragraph (1), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

After notification of award of the Contract and prior to the start of any Work, you shall submit your proposed Cost Loaded Construction Schedule to the Engineer at the pre-construction meeting.

To the "WHITEBOOK", item 1, subsection "e", "h", and "s", DELETE in their entirety and SUBSTITUTE with the following:

e) Monthly progress payments are contingent upon the submittal of an updated Schedule to the Engineer. The Engineer may refuse to process the whole or part of any monthly payment if you refuse or fail to provide an acceptable schedule.

h) Your Schedule shall include 7 Working Days for the Engineer to schedule and conduct a Walk-through inspection and 15 Working Days for the generation of the Punchlist. You shall Work diligently to complete all Punchlist items within 30 Working Days after the Engineer provides the Punchlist.

s) Submit an updated cash flow forecast with every pay request (for each Project ID or WBS number provided in the Contract) showing periodic and cumulative construction billing amounts for the duration of the Contract Time. If there has been any Extra Work since the last update, include only the approved amounts.

    i. Refer to the Sample City Invoice materials in **Appendix D – Sample City Invoice with Cash Flow Forecast** and use the format shown.

    ii. See also the "Cash Flow Forecast Example" at the location below:

    https://www.sandiego.gov/ecp/edocref/

To the "WHITEBOOK", ADD the following:

3. The **90 Calendar Day** Plant Establishment Period is included in the stipulated Contract Time and shall begin with the acceptance of installation of the vegetation plan in accordance with Section 801-6, "MAINTENANCE AND PLANT ESTABLISHMENT".

6-1.1.2 Contracts More Than $500,000 In Value. To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Provide the Schedule to the Engineer in accordance with 6-1.1, "Construction Schedule" and 6-1.2, "Commencement of the Work".

To the "WHITEBOOK", item 2, DELETE in its entirety.

6-1.2 Commencement of the Work. To the "WHITEBOOK", ADD the following:

5. You shall submit a Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule" at the scheduled pre-construction meeting.

6. If a Cost Loaded Construction Schedule is not provided, the pre-construction meeting will still be held. The Contract Time shall commence at issuance of the NTP, but you shall be limited to the following activities until the Cost Loaded Construction Schedule has been submitted to the Resident Engineer with no exceptions taken:

   a) Mobilization of your trailers, associated utility setup, and grading for trailer area

   b) Permit Procurement

   c) Fencing and temporary utilities for your storage areas

   d) Submittal of anticipated critical path submittals

6-1.5.2 Excusable Non-Compensable Delays. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

6-1.5.2 Excusable Non-Compensable and Concurrent Delays.

1. The City shall only issue an extension of time for Excusable Delays that meet the requirements of 6-4.2, "Extensions of Time" for the following circumstances:

   a) Delays resulting from Force Majeure.

   b) Delays caused by weather.

   c) Delays caused by changes to County, State, or Federal law.

2. When a non-excusable delay is concurrent with an Excusable Delay, you shall not be entitled to an extension of Contract Time for the period the non-excusable delay is concurrent with the Excusable Delay.

3. When an Excusable Non-Compensable Delay is concurrent with an Excusable Compensable Delay, you shall be entitled to an extension of Contract Time, but shall not be entitled to compensation for the period the Excusable Non-Compensable Delay is concurrent with the Excusable Compensable Delay.

6-4.2 **Extensions of Time.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The Contract Time shall not be modified except by Change Order.

2. You shall notify the City in writing within **1 Working Day** after the occurrence and discovery of an event that impacts the Project Schedule.

    a) If you believe this event requires a Change Order, you shall submit a **written Change Order request with a report to** the City that explains the request for Change Order within **5 Working Days**. The Change Order request must include supporting data, a general description of the discovery, the basis for extension, and the estimated length of extension. The City may grant an extension of time, in writing, for the Change Order request if you require more time to gather and analyze data.

3. The Engineer shall not grant an extension of Contract Time in accordance with 6-1.5, "Excusable Delays" unless you demonstrate, through an analysis of the critical path, the following:

    a) The event causing the delay impacted the activities along the Project's critical path.

    b) The increases in the time to perform all or part of the Project beyond the Contract Time arose from unforeseeable causes beyond your control and without your fault or negligence and that all project float has been used.

4. Any modifications to the Contract Time will be incorporated into the weekly document that the Engineer issues that stipulates the Contract Time. If you do not agree with this document, submit to the Engineer for review a written protest supporting your objections to the document within **30 Calendar Days** after receipt of the statement. Your failure to file a timely protest shall constitute your acceptance of the Engineer's weekly document.

    a) Your protest will be considered a claim for time extension and shall be subject to 2-10.1, "Claims".

6-4.4 **Written Notice and Report.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Your failure to notify the Resident Engineer within **1 Working Day** OR provide a Change Order request within **5 Working Days** after the event, in accordance with 6-4.2, "Extensions of Time", will be considered grounds for refusal by the City to consider such request if your failure to notify prejudices the City in responding to the event**.**

ADD:

6-6.1.1 **Environmental Document.**

1. The City of San Diego has prepared a **Master Environment Impact Report (EIR)** for **Pacific Highlands Ranch – Subarea III,** for the **Pacific Highlands Ranch**

Village Project, Project No. **7029**, as referenced in the Contract Appendix. You shall comply with all requirements of the **Master EIR** as set forth in **Appendix A.**

2. Compliance with the City's environmental document shall be included in the Contract Price, unless separate bid items have been provided.

SECTION 7 – MEASUREMENT AND PAYMENT

7-3.1 **General.** To the "GREENBOOK" and "WHITEBOOK", paragraph (8), DELETE in its entirety and SUBSTITUTE with the following:

If, within the time fixed by law, a properly executed notice to stop payment is filed with the City, due to your failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment in accordance with applicable laws.

To the "WHITEBOOK", ADD the following:

1. Unless specified otherwise, the Contract Price includes use, consumer, and other taxes mandated by applicable legal requirements.

2. As provided in §7105 of the California Public Contract Code, if the Contract is not financed by revenue bonds, you are not responsible for the cost of repairing or restoring damage to the Project when damage was proximately caused by an act of God, in excess of 5% of the Contract Price, if the following occur:

   a) The Project damaged was built in accordance with the Contract requirements.

   b) There are no insurance requirements in the Contract for the damages.

3. The Lump Sum Bid item **for "Construction of Pacific Highlands Ranch Branch Library"** shall include but not limited to the library building; mobilization, demobilization, site work including parking lot patio, interior, and exterior landscape; fixed furniture, fixed bookshelves, fixed fixtures and furnishings, specialty inspection work, engineered traffic control plans, traffic control Work, traffic control permits and formal partnering workshops; and shall include Paleontological Monitoring, all required testing and special inspection; per the building's codes as specified in the Plans, Contract Documents, and Specifications.

4. The Allowance item for **"Furnitures, Fixtures, and Equipment (FFE) (EOC Type I)"** shall include non-fixed furniture, non-fixed fixtures, non-fixed bookshelf, and non-fixed furnishings, as specified in the Plans, Contract Documents. This item shall include associated delivery costs and sales tax. This item shall not include labor of installation of all allowance items; labor of installation shall be included in Lump Sum Bid item #7 for "Construction of Pacific Highlands Ranch Branch Library" in SSP 7-3.1.3.

5. The Allowance item for **"Telecom/ Data (EOC Type I)"** shall include Communication Systems and its corresponding cablings, connections, conduits, firestopping; Data Communications Network Systems; Security

Systems and cabling, Video Surveillance system including cameras and corresponding conduits and connections; Access Control. Please refer to Technical Specification sections 115100, 270106, 270526, 270528, 270529, 271300, 271500, 272100, 274134, 280514, 280529, 281000, 282300. This item shall not include associated delivery and labor of installation of all allowance items; associated delivery and labor of installation shall be included in Lump Sum Bid items #7 for "Construction of Pacific Highlands Ranch Branch Library" in SSP 7-3.1.3.

6. The Lump Sum Bid item for **"Installation of Artwork"** shall include installation of artwork as specified in the Plans, Contract Documents, and Specifications, as well as coordination with the selected artist and City of San Diego Commissions of Arts and Culture. For materials, please refer to Technical Specification section 093013-9. This item shall not include associated delivery and labor of installation of all allowance items; associated delivery and labor of installation shall be included in Lump Sum Bid item #7 for "Construction of Pacific Highlands Ranch Branch Library" in SSP 7-3.1.3. The Allowance item for "Telecom/ Data (EOC Type I)" shall include Communication Systems and its corresponding cablings, connections, conduits, firestopping; Data Communications Network Systems; Security Systems and cabling, Video Surveillance system including cameras and corresponding conduits and connections; Access Control. Please refer to Technical Specification sections 115100, 270106, 270526, 270528, 270529, 271300, 271500, 272100, 274134, 280514, 280529, 281000, 282300.

   This item shall include associated delivery costs and sales tax. This item shall not include labor of installation of all allowance items; labor of installation shall be included in Lump Sum Bid items #7 for "Construction of Pacific Highlands Ranch Branch Library" in SSP 7-3.1.3.

7. The Lump Sum Bid item 'Additive Alternate A' Item for **"Promenade Plaza Improvements"** shall include landscaping, plantings, lightings, irrigation, fixed fixtures and furnishings, and non-fixed furniture and fixtures, as specified in the Plans, Contract Documents, and Specifications.

7-3.2 Partial and Final Payment. To the "WHITEBOOK**",** item 1**,** DELETE in its entirety and SUBSTITUTE with the following:

1. The Final Payment, which is the release of Retention, shall be paid to you after you have successfully submitted the following required documents:

   a) An affidavit that payrolls and bills for materials, equipment, and other indebtedness connected with the Work for which the City or the City's property might be responsible for or encumbered by.

   b) A certificate evidencing that insurances required by the Contract Documents shall remain in force after Final Payment is currently in effect and shall not be canceled or allowed to expire until at least a 30 Calendar Days prior written notice has been given to the Engineer.

c) Consent of Surety to Final Payment.

d) If required by the Engineer, other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, claims, and security interests or encumbrances arising out of the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the City, you may furnish a bond satisfactory to the Engineer to indemnify the City against such lien.

e) If required in the Contract Documents, the successful completion and submittal of the required reports such as construction demolition, waste recycling, and hydrostatic discharge reports.

f) Required EOCP Final Summary Report in accordance with Section 0-12, "Contract Records and Reports", record drawings, operations manuals, test reports, warranty documentation, and UL labels shall be submitted before requesting the release of retention.

g) Acceptance of the completed Project by the asset owning Department.

To the "WHITEBOOK", ADD the following:

2. Submit an invoice for payment after you successfully complete the required documents and the City will pay the invoice within 30 Calendar Days. The City will pay 6% annually for late retention payments.

7-3.2.1 Application for Progress Payment. To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. The City shall not pay progress or partial payments until you submit to the Engineer an acceptable updated Schedule. It is solely your responsibility to prepare and submit the Schedule updates.

7-3.2.2 Amount of Progress Payments. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The City will pay 6% annually for late progress payments.

2. Progress payments will be considered "late" if the following occur:

   a) The City does not pay the contractor within 30 Calendar Days from receipt of an undisputed and properly submitted invoice. A properly submitted payment invoice means that the City has approved for payment the entire invoice amount or if the Resident Engineer has not disputed any portion of the application within 7 Calendar Days of the date of submission.

   b) The application for payment does not require signing of a Contract Change Order.

3. The Engineer may withhold payment for any of the following reasons:

   a) Defective or incomplete Work.

b) Not providing an updated and accurate Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule".

c) Stop notices, wage orders, or other withholdings required by Applicable Law. Your failure to comply with 5-3.3, "Payroll Records" and the Contractor Registration and Electronic Reporting System requirements of the Contract Documents.

4. The Engineer may back charge the contract for any of the following reasons:

a) Defective or incorrect Work not remedied.

b) Damage to City property or a third party's property that was caused by you.

c) Liquidated Damages.

7-3.2.3 Waiver of Claims at Final Payment. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Your acceptance of Final Payment constitutes a waiver of affirmative Claims by you, except those previously made in writing and identified as unsettled at the time of Final Payment.

7-3.2.4 Withholding of Payment and Back Charge. To the "WHITEBOOK", DELETE in its entirety.

7-3.5.1 General. To the "WHITEBOOK", ADD the following:

1. Unit Bid prices shall not be subject to adjustment regardless of quantity used, or if none is used, for the following Bid items:

a) imported backfill

b) shoring

c) water services

d) house connection sewers

e) water pollution control items

2. Upon discovery and prior to the Work, you shall notify the Resident Engineer if there is a change in Bid item quantity that increases the total Contract Price by 5% or $100,000 or more, whichever is less.

7-3.11 Compensation Adjustments for Price Index Fluctuations. To the "WHITEBOOK", ADD the following:

1. This Contract is not subject to the provisions of The "WHITEBOOK" for Compensation Adjustments for Price Index Fluctuations for paving asphalt.

7-4.3 Markup. To the "WHITEBOOK", item 4, DELETE in its entirety and SUBSTITUTE with the following:

4. When a Subcontractor is performing Extra Work, the allowance for overhead and profit shall be applied to the labor, materials, and equipment costs of the Subcontractor as follows:

a) Regardless of the number of a Subcontractor's tasks for Extra Work, you may only apply 10% for the first $50,000 of the Subcontractor's portion of accumulated total cost then 5% for any remaining costs. You shall not apply 10% to any costs after the first $50,000 of accumulated total costs from performing Extra Work.

b) If the accumulated costs of single or subsequent tasks exceed the $50,000 threshold, you shall instead only apply 5% to any amounts in excess of the $50,000.

c) Regardless of the number of hierarchical tiers of Subcontractors, you may only markup a Subcontractor's Work once.

SECTION 302 – ROADWAY SURFACING

302-4.5 **Scheduling, Public Convenience and Traffic Control.** To the "GREENBOOK", paragraphs (1) and (2), DELETE in their entirety and SUBSTITUTE with the following:

1. In addition to the requirements of Part 6, you shall comply with the following:

   a) At least 5 Working Days prior to commencing the Work, you shall submit your proposed Schedule to the Engineer for approval.

   b) Based upon the approved schedule, you shall notify residents and businesses of the Work and post temporary "No Parking" signs 72 hours in advance.

   c) Requests for changes in the approved Schedule shall be submitted to the Engineer for approval at least 3 Working Days before the street is scheduled to be sealed.

SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

303-5.1.1 **General.** To the "WHITEBOOK", ADD the following:

7. For the purposes of this section, the terms "walk" and "access ramp" shall be synonymous with "sidewalk" and "curb ramp and pedestrian ramp", respectively.

SECTION 402 – UTILITIES

402-2 **PROTECTION.** To the "WHITEBOOK", item 2, ADD the following:

c) Refer to **Appendix J** - **Advanced Metering Infrastructure (AMI) Device Protection** for more information on the protection of AMI devices.

402-6 COOPERATION. To the "GREENBOOK", ADD the following:

1. Notify SDG&E at least 10 Working Days prior to excavating within 10 feet of SDG&E Underground High Voltage Transmission Power Lines (69 KV and higher).

SECTION 601 - TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES

601-2.1.2 Engineered Traffic Control Plans (TCP). To the "WHITEBOOK", ADD the following:

9. Engineered TCP (2 foot x 3 foot size) shall be required for the following areas:
    1. Village Center Loop Road
    2. Part of item #7 on bid list

601-3.5.1 General. To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. Temporary "No Parking" and "No Stopping" signs shall be installed 72 hours before enforcement. Temporary "No Parking" and "No Stopping" signs shall be installed and removed as specified in the Special Provisions. Signs shall indicate specific days, dates, and times of restrictions. If violations occur, call Police Dispatch 619-531-2000 to enforce the Tow-Away notice.

601-7 PAYMENT. To the "WHITEBOOK", item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. The payment for Engineered Traffic Control Plans, traffic control Work, and permits shall be included in the Bid item **for "Construction of Pacific Highlands Ranch Branch Library."**

SECTION 800 – MATERIALS

800-1.1.2 Class "A" Topsoil. To the "WHITEBOOK", item 4, subsection "e", DELETE in its entirety and SUBSTITUTE with the following:

a) The test results shall provide the following information:

i. Date of Testing

ii. Project Name

iii. The Contractor's Name

iv. Source of Material and Supplier's Name

v. Estimate of Quantity Needed in Cubic Yards

vi. Soil Gradation

vii. Fertility

viii. Heavy Metals

ix. Soil Permeability in Inches per Hour

x. Toxic Elements

xi. Chloride Content

xii. pH

xiii. EcE (electrical conductivity)

xiv. SAR (Sodium Absorption Ratio)

xv. Organic Content by Dry Weight

xvi. Carbon : Nitrogen Ratio

xvii. Water-soluble Nutrient Levels

xviii. Recommendations for adding amendments, chemical corrections, or both.

To the "WHITEBOOK", item 5, DELETE in its entirety and SUBSTITUTE with the following:

1. The topsoil shall conform to the following agricultural suitability requirements:

pH	6.0 – 7.5
ECe (electrical conductivity)	0.0 – 3.0
SAR (Sodium Absorption Ratio)	– 5.0
Chloride Content	Less than 150 ppm
Boron Content	Less than 1 ppm
Organic Content	3% to 6% by dry weight
Carbon : Nitrogen Ratio	20:1 maximum
Sandy Loam Gradation Limit*	Gravel over 2mm: Less than 10% by weight Sand: 75% to 85% Sand finer than 100 mesh (0.15 mm): Less than 15% Sand finer that 60 mesh (0.25 mm): Less than 40% Sand larger than 32 mesh (0.5 mm): Minimum 15% Silt: 20% maximum Clay: 15% maximum
Permeability Rate**	2 inches to 5 inches per hour at 80% compaction

* Per USDA Classification Scheme.

** Tested in accordance with USDA Handbook Number 60, method 34b or other approved method.

800-1.2.5 **Mulch.** To the "WHITEBOOK", item 3, subsection "i", ADD the following:

Type 9 Mulch shall be 2 inches maximum in size.

SECTION 1001 – CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPs)

1001-1 **GENERAL.** To the "WHITEBOOK", ADD the following:

7. Based on a preliminary assessment by the City, this Contract is subject to **SWPPP** Risk Level 2.

1001-2.10 **BMP Inspection, Maintenance, and Repair.** To the "WHITEBOOK", ADD the following:

5. Maintenance activities shall be documented by the QSP or QSD in the Construction BMP Maintenance Log for projects subject to SWPPP requirements. See **Appendix G - SWPPP Construction BMP Maintenance Log**.

1001-3.7 **Payment.** To the "WHITEBOOK", item 3, subsection "g", DELETE in its entirety and SUBSTITUTE with the following:

g) BMP Inspection, Maintenance, Repair, and Construction BMP Maintenance Log.

TECHNICALS

PROJECT TITLE SHEET 00 01 01

PROJECT MANUAL – BID ISSUE SPECIFICATION

Pacific Highlands Ranch Branch Library

City of San Diego, San Diego, CA

ARCHITECTS hanna gabriel wells

1955 Bacon Street

San Diego, CA 92107

Phone: 619-523-8485

Fax: 619-523-8487

Web Site: www.architects-hgw.com

END OF DOCUMENT 00 01 01

SPECIFICATION INDEX

DIVISION ZERO GENERAL REQUIREMENTS

Refer to Part 1 of 2018:
San Diego Standard Specifications for Public Works Construction "The White Book"
Standard Specifications for Public Works Construction "The Green Book"

DIVISION ONE	**GENERAL REQUIREMENTS**
01 31 00	Project Management and Coordination
01 32 00	Construction Progress Documentation
01 33 00	Submittal Procedures
01 40 00	Quality Requirements
01 56 39	Temporary Tree and Plant Protection
01 60 00	Product Requirements
01 73 00	Execution
01 74 19	Construction Waste Management and Disposal
01 78 23	Operation and Maintenance Data
01 79 00	Demonstration and Training
01 81 13	Sustainable Design Requirements
01 91 13	General Commissioning Requirements
DIVISION THREE	**CONCRETE**
03 30 00	Cast-In-Place Concrete
03 35 00	Polished Concrete Finishing
DIVISION FIVE	**METALS**
05 12 00	Structural Steel Framing
05 50 00	Metal Fabrications
05 51 50	Metal Access Ladders
05 73 13	Decorative Perforated Panel Assemblies
DIVISION SIX	**WOOD**
06 10 00	Rough Carpentry
06 15 33	Exterior Wood Decking
06 18 00	Structural Glued-Laminated Timber
06 40 13	Architectural Woodwork and Cladding
06 41 16	Plastic Laminate Faced Cabinets
06 52 00	Plastic Structural Assemblies

27 05 29	Pathways for AV Systems
27 13 00	Communication Backbone Cabling
27 15 00	Communication Systems Horizontal Cabling
27 21 00	Data Communications Network Equipment
27 30 00	Fire Alarm
27 41 34	AV Systems
27 41 34	AV Systems – Attachment A
27 51 24	Assistive Listening systems

DIVISION TWENTYEIGHT	**ELECTRONIC SAFETY & SECURITY**
28 05 14	Cabling for Security Systems
28 05 29	Conduits and Back Boxes for Security Systems
28 10 00	Electronic Access Control and Intrusion Detection
28 23 00	Video Surveillance

DIVISION THIRTYONE	**EARTH WORK**
31 00 00	Earthwork
31 10 00	Site Clearing - Grubbing
31 20 00	Earth Moving
31 23 00	Excavation
31 23 16.13	Utility Trenches

DIVISION THIRTYTWO	**EXTERIOR IMPROVEMENTS**
32 05 23	Cement and Concrete for Exterior Improvements
32 12 16	Asphalt Paving
32 13 16	Decorative Concrete Paving
32 17 23.28	Landscape Synthetic Turf Systems
32 84 00	Planting Irrigation
32 91 13	Soil Preparation
32 92 00	Turf and Grasses
32 93 00	Plants

DIVISION THIRTYTHREE	**UTILITIES**
33 10 00	Water Utilities
33 13 00	Disinfecting of Water Utility Distribution
33 30 00	Sanitary Sewerage
33 40 00	Storm Drainage System

END OF SECTION 00 01 02

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. RFIs.
3. Project meetings.

B. Related Requirements:

1. Section 013200 “Construction Progress Documentation” for requirements for documenting the progress of construction during performance of the work.
2. Section 013300 “Submittal Procedures” for requirements administrative and procedural requirements for submitting shop drawings, product data Samples and other submittals.
3. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
4. Section 018113 “Sustainable Design Requirements” for general requirements and procedures for compliance with certain prerequisites and credits need to obtain LEED certification.
5. Section 019113 "General Commissioning Requirements" for coordinating the Work with the Commissioning Authority.

1.2 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.

6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Training and Demonstration

1.3 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Owner name.
2. Owner's Project number.
3. Name of Architect
4. Architect's Project number.
5. Date.
6. Name of Contractor.
7. RFI number, numbered sequentially.
8. RFI subject.
9. Specification Section number and title and related paragraphs, as appropriate.
10. Drawing number and detail references, as appropriate.
11. Field dimensions and conditions, as appropriate.
12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
13. Contractor's signature.
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: form with substantially the same content as indicated above, acceptable to Owner and Architect.

D. Architect's Action: Architect and owner will review each RFI, determine action required, and respond.

1. The following Contractor-generated RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for approval of Contractor's means and methods.

d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.

1. Project name.
2. Name and address of Contractor.
3. Name of Architect
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Project Manager] within **seven** days if Contractor disagrees with response.

1.4 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference
1. The Contractor will schedule a conference at the job site immediately following general mobilization
2. Attendance: Architect, Owner, Consultants, Contractor and Major Subcontractors.
3. The purpose of the conference is to establish working relationships between Owner, Architect, the Contractor during the construction of the project. Topics such as areas of responsibility, operational procedures, payment processing, and scheduling will be covered in detail.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owners Representatives of scheduled meeting dates.
2. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
3. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings
   1. Contractor shall schedule and administer progress meetings throughout the progress of the work. The schedule for meetings shall be as decided at the pre-construction conference. Contractor may schedule called meetings with a minimum of 48-hour notice
   2. Contractor shall make physical arrangements for meetings, prepare agenda, with copies for participants, preside at meetings, record minutes and distribute copies with two days to Architect, participants, and those affected by decisions made at the meetings.
   3. Attendance: Project Superintendent, Architect, major Subcontractors and Suppliers, when specifically requested, and the owner, as appropriate to Agenda.
   4. Suggested Agenda: Review of the work progress, payment requests, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, review status of record drawings, and other items affecting the progress of the work.
   5. Coordinate dates of meetings with preparation of payment requests.

E. LEED requirements Coordination Conference: Owner/LEED Consultant will schedule and conduct a sustainable design coordination conference before starting construction, at a time convenient to Owner, Architect and Contractor.
   1. Attendance: Authorized Representative of Owner, Architect, Contractor, and its superintendent and sustainable design coordinator.
   2. Agenda: Review of Sustainable Design Requirements and Procedures as provided in specification section 018113 “Sustainable Design Requirements"

F. Commissioning Meetings: Commissioning Authority with owners’ representative will schedule and conduct a kick-off meeting in accordance with specification section 019113 “General Commissioning Requirements”
   1. Attendance: Commissioning Agent, Owners Representative, the Design Team (optional), and the Contractor Team.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF file.

B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at weekly intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use software compatible with Windows Operating System and acceptable to Owner.

B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 21 days, unless specifically allowed by Owner.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

    a. Fences Gates and Panels

    b. Electrical Gear

    c. Light Fixtures

    d. Tile Finishes

    e. Ceiling Finishes

    f. Furnishings

    g. Computer, AV, IT and Library equipment

    h. Book Stacks (including integrated lighting and end panels)

    i. Signage and Graphics

    j. Plant Materials

3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Commissioning Time: Include no fewer than 15 days for commissioning.
6. Include all Critical Path Milestones

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Temporary enclosure and space conditioning.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At 2-week intervals, update schedule to reflect actual construction progress and activities. Issue schedule 3-week look-ahead schedules at each regularly scheduled progress (OAC) meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the minutes for each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

I. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms at temporary field offices, and distribute via email to entire project team attending each meeting.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.

9. Meetings and significant decisions.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:
1. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals upon request.

1. Upon receiving Contractors signed copy of Architect’s “Release of Electronic Files”, Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

b. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
c. Digital Data Files will be provided in the format they were created for construction documents, i.e. CAD, REVIT, etc. Reformatting of files for contractors use is the responsibility of the contractor.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 14 days for review of each resubmittal.
3. After the first re-submittal review, any additional time spent reviewing additional, partial, incomplete or unresponsive re-submittals shall be back-charged to the general contractor in the form of dollar per hour ($/hour) credits due the Owner against the General Contractors project management costs. Dollar per hour credits will be based on an average A&E review fee of $150.00 per hour. Hours shall be tracked by Architect their Consultants or the Owner for time spent in review of additional submittal cycles.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 x 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information for processing and recording action taken:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of subcontractor.
g. Name of supplier.
h. Name of manufacturer.
i. Submittal number or other unique identifier, including revision identifier.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

j. Number and title of appropriate Specification Section.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes non-compliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will not review submittals received from sources other than Contractor.

a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

1) Project name.
2) Date.
3) Destination (To:).
4) Source (From:).
5) Name and address of Architect.
6) Name of Construction Manager.
7) Name of Contractor.
8) Name of firm or entity that prepared submittal.
9) Names of subcontractor, manufacturer, and supplier.
10) Category and type of submittal.
11) Submittal purpose and description.
12) Specification Section number and title.
13) Specification paragraph number or drawing designation and generic name for each of multiple items.
14) Drawing number and detail references, as appropriate.
15) Indication of full or partial submittal.
16) Transmittal number, numbered consecutively.
17) Submittal and transmittal distribution record.
18) Remarks.
19) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include a numeric suffix after another decimal point (e.g., LNHS-061000.01.01).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Names of subcontractor, manufacturer, and supplier.
    h. Category and type of submittal.
    i. Submittal purpose and description.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.
    o. Indication of full or partial submittal.
    p. Transmittal number, numbered consecutively.
    q. Submittal and transmittal distribution record.
    r. Other necessary identification.
    s. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations: Identify deviations from the Contract Documents on submittals.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Email electronic submittals as PDF electronic files directly to Architect, or post via General Contractor's Project Specific File Management System and notify Architect.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Deliver Hard Copy submittals directly to Architect.
3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Where Component Manufacturers Installation Instructions are available, a complete set of Installation Instructions for each discrete Component of each distinct assembly and assembly configuration shall be provided. In the event of any conflict between the Installation Instructions of multiple Component Manufacturers products incorporated into the same assembly, the Contractor shall provide an Assembly Specific Installation Instruction (ASII) that wholly integrates all of the constituent, disparate components to the satisfaction of all of the Component Manufacturers. Manufacturer approval of ASII's shall be by written approval of each of the Component Manufacturers.
   In the event that Manufacturer Approval is not available; the Architect's Written Approval is deemed adequate.

4. Where Component Manufacturers Specifications and Product Data are available, a complete set for each distinct component assembly and/or each distinct assembly configuration shall be provided. In the event of any conflict between the Specifications and/or Product Data of multiple Component Manufacturers products incorporated into the same assembly, the Contractor shall provide an Assembly Specific Specification (ASSpec) and/or Revised Product Data that wholly integrates all of the constituent, disparate components to the satisfaction of all of the Component Manufacturers.

Manufacturer approval of ASSpec's and Revised product Data shall be by written approval of each of the Component Manufacturers. In the event that Manufacturer Approval is not available; the Architect's Written Approval is deemed adequate.

5. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

6. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

7. Submit Product Data before or concurrent with Samples.
8. Submit Product Data in the following format:

    a. PDF electronic file.
    b. Three paper copies of Product Data unless otherwise indicated. Architect will return one copy.

C. Shop Drawings: Prepare Project-specific information, drawn by CAD, and accurately scaled.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. All Specialty Contractors shall submit a complete set of Shop Drawings for each distinct component assembly and/or each distinct assembly configuration in their Scope of Work. Where the Manufacturers of incorporated components provide/have available Shop Drawings for those components, those Component Shop Drawings shall be incorporated

into the Specialty Contractor provided Shop Drawings. In the event of any conflict between the Shop Drawings of multiple Component Manufacturers products incorporated into the same assembly, the Contractor shall provide an Assembly Specific Shop Drawing (ASSD) that wholly integrates, all of the constituent, disparate components, to the satisfaction of all of the incorporated Component Manufacturers. Manufacturer approval of ASSD's shall be by written approval of each of the Component Manufacturers. In the event that Manufacturer Approval is not available; the Architect's Written Approval is deemed adequate.

4. Submit Shop Drawings in the following format:

    a. PDF electronic file.
    b. Two opaque (bond) copies of each submittal.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the

following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned

1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:

a. PDF electronic file.

F. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

H. MainVtenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

I. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

J. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

K. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

L. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

M. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

N. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

O. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

P. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

Q. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."

R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Owner or Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner and Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.

3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located. Engineering services are defined as those performed for installations of the system, assembly, or product material, design, and extent to those indicated for this Project.

C. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

D. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with

additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

E. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products, design, and extent to those indicated for this Project.

F. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

    a. Provide test specimens representative of proposed products and construction.
    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project unless specifically allowed.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Owner, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

G. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed unless otherwise indicated.

H. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Architect, Owner and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections on the drawings, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Owner’s reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 015639 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by the average of the smallest and largest diameters at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by the average of the smallest and largest diameters at a height 54 inches (1372 mm) above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

    a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
    b. Arborist's responsibilities.
    c. Quality-control program.
    d. Coordination of Work and equipment movement with the locations of protection zones.
    e. Trenching by hand or with air spade within protection zones.

f. Field quality control.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
2. Detail fabrication and assembly of protection-zone fencing and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

C. Samples: For each type of the following:

1. Organic Mulch: 1-pint volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.6 INFORMATIONAL SUBMITTALS

A. Certification: From contractor, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

B. Maintenance Recommendations: From contractor, for care and protection of trees affected by construction during and after completing the Work.

C. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

D. Quality-control program.

1.7 QUALITY ASSURANCE

A. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the ISA Certified Arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Soil: Stockpiled soil mixed with planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

1. Mixture: Well-blended mix of two parts stockpiled soil to one part planting soil.
2. Planting Soil: Planting soil as specified in Section 329113 "Soil Preparation".

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Forest Fines shredded hardwood.
2. Size Range: 3 inches maximum, 1/2 inch minimum.

3. Color: Natural.

C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart.

a. Height: 48 inches.
b. Color: High-visibility orange, nonfading.

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
1. Lettering: 3-inch high minimum, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1-inch blue vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.

3.3 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
   1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

   1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
   2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune tree roots only under the supervision of a certified arborist.

B. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.

1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).

B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.

C. Cut branches with sharp pruning instruments; do not break or chop.

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage an arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees that are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
2. Large Trees: Provide one new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.

3. Plant and maintain new trees as specified in planting plans and Section 329300 "Plants."

C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 3-inch uniform thickness to remain.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for product submittal requirements.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," City and Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

1.2 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.

B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

C. Certified Surveys: Submit three copies signed by land surveyor or professional engineer.

D. Final Property Survey: Submit three copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Owner and Structural Engineer of locations and details of cutting and await directions from Structural Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey: Engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Temporary Support: Provide temporary support of work to be cut.

C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

E. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

F. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Recycling nonhazardous construction waste.
   2. Disposing of nonhazardous construction waste.

B. Related Sections:
   1. Section 01 81 13 “Sustainable Design Requirements”

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.3 PERFORMANCE REQUIREMENTS

A. General: Comply with City of San Diego requirements for recycling and disposal of construction and demolition debris, Information Bulletin 119, dated August 2008.

1.4 ACTION SUBMITTALS

A. Receipts: Submit all recycling, reuse and disposal receipts from project related debris to owner for their use in obtaining owner’s deposit refund with the City of San Diego.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: See City of San Diego approved list- available at: http://www.sandiego.gov/environmental-services/recycling/cdrecycling.shtml

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically tabbed and indexed file. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

B. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 10 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 10 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

C. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," and Project title and date of substantial completion. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

END OF SECTION 01 78 23

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.
4. Scheduling with Owner’s facilities and Engineering staff.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module, when on-site training and demonstration are not feasible. Provide:
   a. One (1) digital video on USB thumb-drive of Training for facilities and Engineering

1.3 CLOSEOUT SUBMITTALS

1. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on USB Stick, tagged for identification.

1.4 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.
   e. Equipment function.
   f. Operating characteristics.
   g. Limiting conditions.
   h. Performance curves.

2. Documentation: Review the following items in detail:

   a. Emergency manuals.
   b. Operations manuals.
   c. Maintenance manuals.
   d. Project record documents.
   e. Identification systems.
   f. Warranties and bonds.
   g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.

f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times.

   1. Schedule training with Owner with at least 10 days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

END OF SECTION 01 79 00

SECTION 01 81 13
SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) **Gold** certification based on USGBC's LEED v4 BD+C.

1. Specific requirements for LEED are also included in other Sections.
2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
3. A copy of the LEED Project checklist is attached at the end of this Section for information only.

    a. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on aspects of Project that are not part of the Work of the Contract.

4. Definitions included in the "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) Reference Guide and online amendments apply to this Section.

B. Related Requirements:
1. Section 01 33 00, "Submittal Procedures."
2. Section 01 74 19, "Construction Waste Management and Disposal."
3. Section 01 78 23, "Operation and Maintenance Data."
4. Divisions 03, 05 through 12, 21 through 23, 26 through 28, and 31 through 33 for LEED requirements specific to the work of each of these Sections. Requirements may or may not include reference to LEED.

1.03 DEFINITIONS

A. Bio-Based Materials: Materials that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM D 6866 and be legally harvested, as defined by the exporting and receiving country.

B. CDPH Standard Method v1.1: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1–2010, for the emissions testing and requirements of products and materials.

C. Chain-of-Custody (COC): A procedure that tracks a product form the point of harvest or extraction to its end use, including all successive stage of processing, transformation, manufacturing, a distribution.

D. Chain-of-Custody Certificates: Certificates signed by manufacturers and fabricators certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

E. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.

F. Corporate Sustainability Report: A third-party verified report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain.

G. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and peer-reviewed.

1. Product-Specific Declaration: A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
2. Industry-Wide (Generic) EPD: Provide products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
3. Product-Specific Type III EPD: A product with a third-party certification, including external verification, in which the manufacturer is explicated recognized by the program operator. EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

H. Extended Producer Responsibility (EPR): Measures undertaken by the maker of a product to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the products' useful life.

I. Health Product Declaration Open Standard (HPD): A standard format for reporting product content and associated health information for building products and materials.

J. Indoor Air Quality (IAQ) Management Plan: Plan developed by the Contractor to provide a healthy indoor environment for workers and building occupants during construction. Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "IAQ Guidelines for Occupied Buildings Under Construction."

K. Leadership Extraction Practices: Products that meet at least one of the responsible extraction criteria, which include: extended producer responsibility; bio-based materials; FSC wood products; materials reuse; recycled content; and other USGBC approved programs.

L. Material Cost: The dollar value of materials being provided to the site, after Contractor mark-ups, including transportation costs, taxes, fees, and shop labor, but excluding field equipment and field labor costs.

M. Materials Reuse: Reuse includes salvaged, refurbished, or reused products.

N. Multi-Attribute Optimization: Third party certified products that demonstrate impact reduction below industry average in at least three of the following six categories: global warming potential; stratospheric ozone depletion; acidification; eutrophication; tropospheric ozone creation; nonrenewable resource depletion.

O. Recycled Content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.

1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

P. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles from the Project site.

Q. Volatile Organic Compounds (VOC) Emissions Test: Refer to CDPH Standard Method v1.1 definition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Work of this project includes completed building and application for LEED certification. Work is not complete until Owner has accepted USGBC’s final review of LEED certification.

1. Provide documentation required by LEED and LEED review.

B. Provide materials and procedures necessary to obtain LEED prerequisites and credits required in this Section. Other Sections may specify requirements that contribute to LEED prerequisites and credits. Refer to other sections for additional materials and procedures necessary to obtain LEED prerequisites and credits.

C. Respond to questions and requests for additional information from Architect and the USGBC regarding LEED credits until the USGBC has made its determination on the project's LEED certification application.

D. LEED Online Submittals: Upload LEED documentation submittal data directly to USGBC project “LEED Online” website. Complete online forms at least monthly and as necessary to document LEED credits for submittals required in this Section.

E. LEED Conference: Schedule and conduct a conference at a time convenient to Owner and Architect within 21 days prior to commencement of the work. Advise Architect, Owner's Commissioning Authority, and Owner’s Project Manager of scheduled meeting dates.

1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner’s Project Manager, Achitect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend

the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: LEED goals for the project, Contractor's action plans, and discussion of targeted LEED Prerequisites and Credits.
3. Minutes: Record and distribute minutes to attendees and other entities with responsibilities for obtaining LEED Credits.

1.05 ACTION SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

1. Submit each LEED submittal simultaneously with applicable product submittal.

B. LEED Documentation Submittals:

1. General, Sustainable Materials Attributes Form: Project submittals must be accompanied by a completed Sustainable Materials Attributes Form. Submittal packages must also include highlighted documentation supporting the sustainability claims made on the Sustainable Materials Attributes Form.

    a. Provide location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

2. EAp3, Building-Level Energy Metering: Product data for meters, sensors, and data collection system used to provide continuous metering of building energy-consumption performance.
3. MRp2/MRc5, Construction and Demolition Waste Management: Comply with submittal requirements of Section 01 74 19 "Construction Waste Management and Disposal."
4. MRc2, Building Product Disclosure and Optimization: Environmental Product Declarations complying with LEED requirements.
5. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 1, Raw Material Source and Extraction Reporting.

    a. Corporate sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.

6. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices.

    a. Extended Producer Responsibility: Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
    b. Bio-Based Materials: Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
    c. Certified Wood: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
    d. Materials Reuse: Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
    e. Recycled Content: Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and

preconsumer recycled content for products having recycled content. Include statement of costs.

7. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

    a. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting, including but not limited to the following:
        1) Manufacturer Inventory.
        2) Health Product Declaration.
        3) Cradle to Cradle certifications.
        4) Declare product labels.
        5) ANSI/BIFMA e3 Furniture Sustainability Standard.

8. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

    a. Documentation for products that comply with LEED requirements for material ingredient optimization, including but not limited to the following:
        1) GreenScreen Benchmarks.
        2) Cradle to Cradle certifications.
        3) REACH optimizations.

9. EQp2/EQc3/EQc4, Indoor Air Quality: Comply with submittal requirements of Section 01 57 31, "Indoor Air Quality Management."
10. EQc2, Low-Emitting Materials: Product data, indicating VOC content and emissions testing documents showing compliance with requirements for low-emitting materials, for the following materials:

    a. Paints and coatings.
    b. Adhesives and sealants.
    c. Flooring.
    d. Products containing composite wood or agrifiber products or wood glues.
    e. Ceilings, walls, thermal, and acoustic insulation.
    f. Exterior applied materials.
    g. Furniture.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For LEED coordinator.

B. Project Materials Cost Data: Provide statement indicating total cost and shop labor for materials used for Project. Costs exclude site labor, overhead, and profit. Include breakout of costs for the following categories of items:

1. Wood construction materials.
2. Furniture.
3. Passive plumbing materials.
4. Passive mechanical (HVAC) materials.
5. Passive electrical materials.
6. Earthwork and exterior improvements, hard costs.

C. LEED Action Plan Components: Provide preliminary submittals within 30 days of date established for the Notice to Proceed indicating how the following requirements will be met:

1. MRp2/MRc5, Waste management plan, complying with Section 01 74 19 "Construction Waste Management and Disposal."
2. EQp2/EQ3/EQ4, Indoor air quality plan, complying with Section 01 57 31, "Indoor Air Quality Management."

D. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. MRp2/MRc5, Waste reduction progress reports complying with Section 01 74 19 "Construction Waste Management and Disposal."
2. MRc2, Building product disclosure and optimization – environmental product declarations.
3. MRc3, Building product disclosure and optimization – sourcing of raw materials.

    a. General: Manufacturing locations.
    b. Option 1: Corporate sustainability reports.
    c. Option 2:
        1) Extended producer responsibility.
        2) Bio-based materials.
        3) Certified wood products.
        4) Materials reuse.
        5) Recycled content.

4. MRc4, Building product disclosure and optimization – material ingredients.
5. EQc2, Low emitting materials.

    a. Low Emitting Materials Tracking Sheet monitoring the project’s progress towards targeted LEED Indoor Environmental Quality Credits. Tracking Sheet to be presented at construction meetings.

6. EQc3, Indoor air quality, during construction, complying with Section 01 57 31, "Indoor Air Quality Management."
7. EQc4, Indoor air quality assessment, complying with Section 01 57 31, "Indoor Air Quality Management."

1.07 QUALITY ASSURANCE

A. LEED Coordinator: Engage a LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the

Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated. Contractor to determine a combination of credit options best suited for achieving credits required.

1. Exclusions: Special equipment, such as elevators, escalators, process equipment, and fire suppression systems, is excluded from the credit calculations. Also excluded are products purchased for temporary use on the project, like formwork for concrete.

2.02 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

A. MRc2, Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): Option 1. Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which meet one of the disclosure criteria:

1. Product-Specific Declaration: Valued as one quarter (1/4) of a product.
2. Industry-Wide (Generic) EPD: Valued as one half (1/2) of a product.
3. Product-Specific Type III EPD: Valued as one whole product.

B. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 1, Raw Material Source and Extraction Reporting. Provide at least 20 permanently installed products (sourced from at least 5 different manufacturers) which meet one of the disclosure criteria:

1. Corporate sustainability reports.

C. MRc3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: Option 2, Leadership Extraction Practices. Provide products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project:

1. Extended producer responsibility program.
2. Bio-based materials.
3. Certified Wood: Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

a. Rough carpentry.
b. Miscellaneous carpentry.
c. Heavy timber construction.
d. Wood decking.
e. Metal-plate-connected wood trusses.
f. Structural glued-laminated timber.
g. Finish carpentry.
h. Architectural woodwork.
i. Wood paneling.
j. Wood veneer wall covering.
k. Wood flooring.
l. Wood lockers.
m. Wood cabinets.
n. Furniture.

4. Recycled content.
   a. Exceptions: Do not include fire protection, operational plumbing, operational mechanical, and operational electrical components, and specialty items, such as elevators and equipment, in the calculation.

D. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 1, Material Ingredient Reporting.

1. Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm), which meet one of the following disclosure criteria:

   a. Manufacturer Inventory.
   b. Health Product Declarations (HPDs).
   c. Cradle to Cradle (C2C) certifications.
   d. Declare product labels.
   e. ANSI/BIFMA e3 Furniture Sustainability Standard.

E. MRc4, Building Product Disclosure and Optimization, Material Ingredients: Option 2, Material Ingredient Optimization.

1. Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project, which meet one of the following disclosure criteria:

   a. GreenScreen benchmarks.
   b. Cradle to Cradle certifications.
   c. REACH optimizations.

2.03 LOW-EMITTING MATERIALS

A. EQc2, Low-Emitting Materials, General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health, (CDHP), Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's documentation demonstrating compliance must state the range of total VOCs (tVOC) after 14 days measured as specified in the CDPH Standard Method v1.1 as follows:

1. 0.5mg/m3 or less,
2. between 0.5 and 5.0 mg/m3 or,
3. 0.50 mg/m3 or more.

B. EQc2, Low-Emitting Materials, Paints and Coatings: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

Product Type:	Allowable VOC Content (g/L):
Bond Breaker	350
Clear wood finishes - Varnish	275

Clear wood finishes – Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant – Architectural Coatings, excluding IM coatings	50
Colorant – Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete – Curing compounds	100
Concrete – Curing compounds for roadways & bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings – Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings – Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150
Industrial maintenance coatings	100
Industrial maintenance coatings – High temperature IM coatings	420
Industrial maintenance coatings – Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings – Zinc rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac- Clear	730
Shellac – Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings – repair	340
Swimming pool coatings – other	340

Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood preservatives	350
Low solids coatings	120

C. EQc2, Low-Emitting Materials, Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. EQc2, Low-Emitting Materials, Adhesives and Sealants: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits for VOC content when calculated according to South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements in effect on July 1, 2005, and rule amendment date January 7, 2005:

Architectural Applications:	Allowable VOC Content (g/L):
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Computer diskette manufacturing	350
Contact adhesive	80
Special purpose contact adhesive	250
Tire retread	100
Adhesive primer for traffic marking tape	150
Structural wood member adhesive	140
Sheet applied rubber lining operations specialty	850
Top and Trim adhesive	250
Substrate Specific Applications:	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50

Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
Sealants:	
Architectural sealant	250
Marine deck sealant	760
Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealant	420
Sealant Primers:	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

1. Exception: The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

E. EQc2, Low-Emitting Materials, Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. EQc2, Low-Emitting Materials, Flooring: Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

G. EQc2, Low-Emitting Materials, Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

H. EQc2, Low-Emitting Materials, Ceilings, Walls, Thermal, and Acoustic Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

I. EQc2, Low-Emitting Materials, Furniture: At least 90 percent of furniture, measured by cost, shall be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011; comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate.

J. Additional Low-Emitting Requirements:

1. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
2. If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.
3. Methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants.

2.04 INDOOR WATER USE REDUCTION

A. WEp2, Indoor Water Use Reduction, Appliances: Provide ENERGY STAR or performance equivalent appliances.

B. WEp2/WEc2, Indoor Water Use Reduction, Plumbing Fixtures: Do not exceed water flow requirements indicated in Division 22 - PLUMBING.

PART 3 - EXECUTION

3.01 NONSMOKING BUILDING

A. EQp2, Environmental Tobacco Smoke Control: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

3.02 CONSTRUCTION WASTE MANAGEMENT

A. MRp2 MRc5, Construction and Demolition Waste Management: Comply with Section 01 74 19 "Construction Waste Management and Disposal."

3.03 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. EQc3/EQc4, Construction Indoor Air Quality Management Plan:

END OF SECTION 01 81 13

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes general requirements that apply to the implementation of commissioning without regard to specific systems, assemblies, or components.

B. The commissioning activities have been developed to verify that the building systems to be commissioned meet the owner's requirements, and to support the owner in meeting the guidelines for the following:

1. California Building Standards Code, Title 24, Part 6, Energy Code sections 120.8(a) through (i) compliance.
2. California Building Standards Code, Title 24, Part 11, Green Building Standards sections 5.410.2 through 5.410.2.6 compliance.
3. United States Green Building Council's (USGBC) LEED v4 rating program for the Energy and Atmosphere Prerequisite Fundamental Commissioning.
4. United States Green Building Council's (USGBC) LEED v4 rating program for the Energy and Atmosphere Prerequisite Fundamental Commissioning and Credit Enhanced Commissioning.

C. Related Documents:

1. Owner's Project Requirements by reference for information only.
2. Basis of Design by reference for information only.
3. Commissioning Plan.

1.2 DEFINITIONS AND ABBREVIATIONS

A. Basis of Design (BOD) – document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design. The BOD should cover all systems to be commissioned.

B. Commissioning Issues Log (CIL) – formal and ongoing record of problems or concerns discovered during the course of the Cx process and their resolution.

C. California Energy Commission (CEC) – California's primary energy policy and planning agency, committed to reducing energy costs and environmental impacts of energy use while ensuring a safe, resilient, and reliable supply of energy.

D. Commissioning (Cx) – the process of verifying and documenting that a building and its systems and assemblies are planned, designed, installed, tested, and can be operated and maintained to meet the owner's project requirements and contract documents.

E. CxA – Qualified Commissioning Authority, Specialist, Agent, or Coordinator overseeing the commissioning activities.

F. Leadership in Energy and Environmental Design (LEED) – a rating system devised by the United States Green Building Council (USGBC) to evaluate the environmental performance of a building and encourage market transformation towards sustainable design.

G. Owner's Project Requirements (OPR) – document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

H. O&M – Operations and Maintenance

I. Systems, subsystems, equipment, and components: where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 SYSTEMS TO BE COMMISSIONED:

A. The following systems will be commissioned as part of this project, refer to the Cx Plan.

1. Heating, Ventilation, and Air Conditioning Systems (HVAC)
2. HVAC Controls / Energy Management System
3. Utility metering and sub-metering
4. Domestic Hot Water System
5. Lighting and Lighting Control System
6. Renewable Energy Systems – Photovoltaics

1.4 COMMISSIONING TEAM

A. The commissioning team shall consist of, but not be limited to, commissioning authority, owner's representative, design team, contractor, representing subcontractors, and acceptance technicians.

B. Communication: Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. A high level of communication and cooperation between the commissioning team is essential to the success of the commissioning effort. The CxA shall have direct communication with the owner's representative.

C. Members Appointed by the Owner:

1. Design Team Architect and Engineers responsible for the project design.
2. Independent CxA that is certified in commissioning.
3. Independent CALCTP Certified Acceptance Test Technician to verify and certify lighting control compliance with California Building Code, Title-24, Part 6.

D. Members Appointed by the Contractor:

1. Systems to be commissioned sub-contractors and/or vendor representatives with expertise and authority to act on the contractor's behalf in respective systems to perform commissioning process activities.
2. Certified Mechanical System Acceptance Test Technician to verify and certify mechanical systems compliance with California Building Code, Title-24, Part 6.

1.5 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities and training.

C. Provide the construction documents, prepared by the Design Team and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 DESIGN TEAM RESPONSIBILITIES

A. Coordinate Design Review Kickoff Meeting with Owner and CxA

B. Provide design submittal schedule to the CxA for reference.

C. Provide design submittal packages (drawings, specifications, and BOD) to the CxA for review.

D. Provide responses to CxA design review comments.

E. Review, sign, and return CEC Forms provided by the CxA.

F. Incorporate Cx and Training requirements into the construction documents.

G. Review and comment on Cx test documents.

1.7 CONTRACTOR'S RESPONSIBILITIES

A. The General Contractor and subcontractors shall comply with all the Commissioning requirements.

B. Coordinate representatives with expertise and authority to act on their behalf to participate in and perform commissioning process activities.

C. Provide the CxA with overall and look-ahead construction schedules.

D. Integrate all commissioning activities and milestones into the project schedules.

E. Provide documents listed in the submittal section to the CxA for review concurrently with the Design Team.

F. Complete the Prefunctional Checklists provided by the CxA for each piece of equipment to be commissioned.

G. Provide completed California non-residential certificate of compliance installation and acceptance forms (NRCI and NRCA, respectively).

H. Develop and conduct the systems O&M training program/plan for the maintenance staff and other appropriate parties.

I. Compile the Systems Manual and distribute to the CxA for review.

J. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

K. Cooperate with the CxA for resolution of issues recorded in the Issues Log.

L. Complete commissioning process test procedures under direction of the CxA.

M. Provide all calibrated instruments and tools necessary to fulfill the commissioning testing requirements.

N. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functional product.

1.8 COMMISSIONING AUTHORITY RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan(s) and report(s).

C. Review and comment on design and construction submittals.

D. Convene commissioning team meetings.

E. Provide documents listed in the submittal section for Cx Team review and reference.

F. Review the completed Prefunctional Checklists provided by the Contractor.

G. Verify the execution of commissioning plan activities using random sampling. The sampling rate may vary from 10 to 100 percent at the discretion of the CxA, refer to the Cx Plan for details. Verification will include, but is not limited to, design submittals, construction submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

H. Witness and document functional performance tests.

I. Prepare and maintain the Cx Issues Log.

J. Review the Systems Manual provided by the Contractor and verify it meets requirements of the contractor documents.

K. Outline Current Facilities Requirements and O&M Plan and On-Going Cx Plan.

L. Collaborate in the development of monitoring-based commissioning procedures and include in the Cx Plan.

M. Review building operations 10 months after substantial completion.

1.9 SUBMITTALS

A. Owner

1. Owner's Project Requirements
2. Completed and signed CEC Certificate of Compliance NRCC forms
3. Applicable documents required for the Systems Manual

B. Design Team

1. Design schedule
2. Design submittal packages (drawings, specifications, and BOD)
3. Completed and signed CEC Certificate of Compliance NRCC forms
4. Design review responses
5. Applicable documents required for the Systems Manual

C. Contractor

1. Construction overall and look-ahead schedules
2. Equipment Submittals for systems to be commissioned
3. DALT Plan and Report (if applicable)
4. Completed Prefunctional Checklists
5. California certificate of compliance installation forms (NRCI)
6. California certificate of compliance acceptance forms (NRCA)
7. Startup Reports (contractor's with certifications and/or manufacturer's)
8. Certified TAB Plan and Report
9. Control System Shop Drawings
10. Control System Point-to-Point Checks
11. Control System Trend Data Log Reports
12. Commissioning Issues Log Responses/Actions
13. Systems Manual for Equipment to be Commissioned
14. Training Plan and Attendees Sheet

D. Commissioning Authority

1. Commissioning Plan(s)
2. Design and Construction Submittal Review Comments
3. CEC Certificate of Compliance Forms
4. NRCC-CXR-01E – Design Review Kickoff
5. NRCC-CXR-02E – General

6. NRCC-CXR-03E or 04E – Simple or Complex HVAC Systems
7. NRCC-CXR-05E – Design Review Signature Page
8. Prefunctional Checklists (PFC)
9. Functional Performance Tests (FPT)
10. Commissioning Issues Log
11. Commissioning Report(s)
12. Systems Manual Template
13. Current Facilities Requirements and O&M Plan Outline
14. On-going Cx Plan Outline

1.10 SYSTEMS MANUAL

A. A document focusing on the operation of systems to be commissioned that provides information needed to understand, operate, and maintain the equipment and systems to be commissioned. The Systems Manual is in addition to the record construction drawings, documents, and the O&M Manuals supplied by the Contractor. At a minimum the System Manual shall include:

1. Executive summary, OPR, BOD, and Cx Report
2. Site information, facility description, project history, current requirements, and contacts.
3. Description of major building systems to be commissioned.
4. Site equipment inventory and maintenance notes.
5. Basic O&M documentation, including general site operating procedures, basic troubleshooting, maintenance requirements and schedule, site events log, and warranties.
6. As-built drawings and one-line diagrams of commissioned systems
7. As-built control sequences of operations, point lists, and drawings
8. Recommended recommissioning schedule and tests
9. Recommended schedule for calibration of sensors and actuators

1.11 O&M TRAINING PLAN

A. A document outlining the O&M personnel training to enable them to adequately operate and maintain each equipment type or system to be commissioned. Training materials should include system and equipment overview, review and demonstration of operation, servicing, and preventative maintenance, review of the Systems Manual, and review of the record drawings. At a minimum the plan includes: learning goals and objectives, training agenda, topics, length of instruction, instruction information and qualifications, location, attendance forms, and training materials.

PART 2 – PRODUCTS

2.1 NOT USED

PART 3 – EXECUTION

3.1 DESIGN PHASE

A. OPR Review – The CxA shall review the OPR. At a minimum it should include energy efficiency goals, ventilation requirements, facility functions, facility hours, and equipment, systems, and building envelope expectations.

B. Design Kickoff – During the schematic design phase of the project, the owner's representative, design team, and CxA shall meet to discuss the project scope, schedule, OPR, and design phase Cx process. The team shall complete and sign the applicable CEC Certificate of Compliance.

C. Design Review – The CxA shall review and provide comments to design submittal packages (BOD, plans, and specifications) at approximately 50 and 90 percent complete (at a minimum). The CxA shall provide applicable California Energy Commission Certificate of Compliance forms to the Design Team. The Design Team shall provide responses and signed CEC compliance documents.

D. Cx Plan – The CxA shall develop the Cx Plan based upon the OPR, BOD, design drawings, and design specifications to document how the project will be commissioned. At a minimum, the plan shall include general project information, commissioning goals, systems to be commissioned, plans to test, commissioning team, roles and responsibilities, and process activities. The plan shall be reviewed and approved by the Owner. At the discretion, the building official confirms demonstrated compliance at Plan Review by a receipt of a copy of the commissioning specifications. The Cx Plan shall be incorporated into the design bid documents.

3.2 CONSTRUCTION/ACCEPTANCE PHASE

A. Cx Construction kick-off meeting - Commissioning during construction begins with a kick-off meeting conducted by the CxA with the Owner's Representative, the Design Team (optional), and the Contractor team with involved sub-contractors/representatives to introduce team members, review roles and responsibilities, and review Cx activities.

B. Review contractor submittals – The CxA shall review and comment on contractor submittals concurrently with the design team for equipment that will be commissioned to verify compliance with the OPR and design documents. The CxA will use approved submittals to expand start-up and test procedures.

C. Pre-functional/Construction Verification Checks – Cx site visits and meetings will be conducted as required throughout the construction process. The CxA will review contractor completed pre-functional checklists to monitor and verify that the construction and installation process is in accordance with the OPR, BOD, design plans and specifications. Observation reports are intended to provide early indication of an installation issue which will need correction or review.

D. Commissioning Issues Log – The CxA will document deficiencies and concerns through the commissioning process in the Cx Issues Log, and track the resolution of the issues. The log shall be distributed to the Cx Team for resolution and documentation.

E. Start-up Verification – Contractor shall provide the CxA with the completed contractor and/or manufacturer equipment start-up documents, certifications, California Acceptance Forms, TAB report, and point-to-point checks with sensor calibration documentation for the systems to be commissioned to validate systems are ready for testing. The CxA will review the documents prior to functional testing and included documentation in the Final Cx Report. Items left incomplete, which later cause deficiencies or delays during FPTs, may result in back charges to the responsible contractor.

F. Control System Trend Review – When applicable, the Contractor shall provide the CxA with trend log reports for review and analysis. The CxA shall provide the Contractor with required points and report format. Trend log reports may be utilized to verify proper system operation, close issues, re-testing, seasonal/deferred testing, and/or post-occupancy review.

G. Functional Performance Tests (FPT) – The CxA shall develop FPT procedures for the systems to be commissioned that include verification of proper operation of equipment features. The Contractor and Design Team shall review and provide input for development of procedures. Functional performance tests shall demonstrate the correct operation of each component, system and system-to-system interface in accordance with the Commissioning Plan. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made. Once the Contractor has confirmed systems are operation according to the contractor documents, the tests are to be executed by the Contractor under the direction and observation of the CxA. The CxA shall document test results and update the issues log.

H. Retesting - Any required retesting due to items of non-compliance in material, installation, or setup will be corrected and retested at the cost of the responsible contractor.

I. Commissioning system PFC's and FPTs shall be completed before Final Certificate of Occupancy.

J. O&M submittal review - The CxA shall review submittals to verify the O&M information provided by the contractor meets the intent of O&M submittal contract requirements and provides benefit to the O&M user for training and operational reference.

K. Systems Manual – Prior to O&M training the Contractor shall compile the systems manual for the equipment to be commissioned. The CxA can provide a template, and shall review and verify that it meets the requirements of the contract documents.

L. O&M Training – The Contractor shall develop and conduct the systems operation training program/plan for the maintenance staff and other appropriate parties. The CxA shall review, comment on, and document the training plan provided by the Contractor and verify that training requirements of the contract documents for the systems to be commissioned have been met. A list of the date(s) and times of the training, an attendance sheet, and a summary of the training is to be provided to the CxA for inclusion in the final Cx Report.

M. Final Cx Report – Upon completion of the Cx Process, the CxA will prepare the Final Cx Report documenting the commissioning process activities undertaken through the design and construction phases of the building project. The report shall be completed and provided to the Owner as well as the Jurisdictional Authority upon request.

3.3 POST-OCCUPANCY/WARRANTY PHASE

A. Deferred/seasonal testing – The CxA will determine if seasonal or deferred testing will be necessary due to ambient conditions, schedule issues, or other conditions preventing testing during the acceptance phase.

B. 10-month Review – perform the 10-month review of building operations after substantial completion to ensure that the building is being operated according to the owner's requirements. The review may include: interviews with occupants and maintenance staff, re-tests, and review of outstanding commissioning related issues, building automation trends, and operations plan.

C. Cx Report Addendum – The CxA shall prepare an Addendum to the Final Cx Report post the 10-month review with updated pertinent documentation to indicate whether systems continue to perform according to the contract documents.

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Building frame members.
7. Building walls.

B. Related Sections:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
2. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

2. Product Data for Credit IEQ 4.3: For liquid floor treatments and curing and sealing compounds, documentation including printed statement of VOC content.
3. Design Mixtures for Credit ID 1.1: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.

C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

E. Formwork Shop Drawings: Prepared by or under the supervision of a professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

G. Samples: For vapor retarder.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

B. Material Test Reports: For the following, from a testing agency, indicating compliance with requirements:

1. Aggregates.
2. Portland cement
3. Fly ash

C. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

D. Field quality-control reports.

E. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Manufacturer: A firm that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Testing Agency: An independent agency, acceptable to authorities having jurisdiction.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

D. Welding Qualifications: Qualify procedures according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Build panel approximately 200 sq. ft. for slab-on-grade and 100 sq. ft. (9.3 sq. m) for formed surface in the location indicated or, if not indicated, as directed by Architect.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

H. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.
e. Special concrete finish subcontractor.

2. Review the following:
a. Special inspection and testing and inspecting agency procedures for field quality control
b. Concrete finishes and finishing
c. Cold- and hot-weather concreting procedures
d. Curing procedures
e. Construction contraction and isolation joints, joint-filler strips, semirigid joint fillers
f. Forms and form removal limitations
g. Vapor-retarder installation
h. Anchor rod and anchorage device installation tolerances
i. Steel reinforcement installation
j. Floor and slab flatness and levelness measurement
k. Concrete repair procedures and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 inch by 3/4 inch minimum.

G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

D. Galvanized Reinforcing Bars: ASTM A 767, zinc coated after fabrication and bending.
1. Steel Reinforcement: ASTM A 615, Grade 60, deformed
2. Steel Reinforcement: ASTM A 706, deformed

E. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from galvanized-steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I / Type II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch (25mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Lightweight Aggregate: ASTM C 330, 3/4-inch (19 mm) nominal maximum aggregate size.

E. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Monofilament Micro-Fibers:

1) Axim Italcementi Group, Inc.; Fibrasol II P.
2) Euclid Chemical Company (The), an RPM company; Fiberstrand 100.
3) FORTA Corporation; FORTA Econo-Mono.
4) Grace Construction Products, W. R. Grace & Co.; Grace MicroFiber.
5) Metalcrete Industries; Polystrand 1000.
6) Nycon, Inc.; ProConM.
7) Propex Concrete Systems Corp.; Fibermesh 150.
8) Sika Corporation; Sika Fiber PPM.

b. Fibrillated Micro-Fibers:

1) Axim Italcementi Group, Inc.; Fibrasol F.
2) Euclid Chemical Company (The), an RPM company; Fiberstrand F.
3) FORTA Corporation;
4) Grace Construction Products, W. R. Grace & Co.; Grace Fibers.
5) Nycon, Inc.; ProConF.
6) Propex Concrete Systems Corp.; Fibermesh 300.
7) Sika Corporation; Sika Fiber PPF.

2.7 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513 for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Greenstreak.
    b. Williams Products, Inc.
    c. W.R. Meadows, Inc.

B. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch (10 by 19 mm).

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Adeka Ultra Seal/OCM, Inc.; Adeka Ultra Seal.
    b. Greenstreak; Hydrotite.
    c. Vinylex Corp.; Swellseal.
    d. Superstop; Progress Unlimited, Inc.

2.8 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
    b. Fortifiber Building Systems Group; Moistop Ultra.
    c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
    d. Insulation Solutions, Inc.; Viper VaporCheck.
    e. Meadows, W. R., Inc.; Perminator.
    f. Raven Industries Inc.; Vapor Block.
    g. Reef Industries, Inc.; Griffolyn Type-65G.
    h. Stego Industries, LLC; Stego Wrap Class A.

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.9 LIQUID FLOOR TREATMENTS

A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ChemMasters; Chemisil Plus.
b. ChemTec Int'l; ChemTec One.
c. Conspec by Dayton Superior; Intraseal.
d. Curecrete Distribution Inc.; Ashford Formula.
e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
f. Edoco by Dayton Superior; Titan Hard.
g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
h. Kaufman Products, Inc.; SureHard.
i. L&M Construction Chemicals, Inc.; Seal Hard.
j. Meadows, W. R., Inc.; LIQUI-HARD.
k. Metalcrete Industries; Floorsaver.
l. Nox-Crete Products Group; Duro-Nox.
m. Symons by Dayton Superior; Buff Hard.
n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

2.10 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
b. BASF Construction Chemicals - Building Systems; Confilm.
c. ChemMasters; SprayFilm.
d. Conspec by Dayton Superior; Aquafilm.
e. Dayton Superior Corporation; Sure Film (J-74).
f. Edoco by Dayton Superior; BurkeFilm.
g. Euclid Chemical Company (The), an RPM company; Eucobar.
h. Kaufman Products, Inc.; Vapor-Aid.
i. Lambert Corporation; LAMBCO Skin.
j. L&M Construction Chemicals, Inc.; E-CON.
k. Meadows, W. R., Inc.; EVAPRE.
l. Metalcrete Industries; Waterhold.
m. Nox-Crete Products Group; MONOFILM.
n. Sika Corporation; SikaFilm.
o. SpecChem, LLC; Spec Film.
p. Symons by Dayton Superior; Finishing Aid.
q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
r. Unitex; PRO-FILM.
s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. BASF Construction Chemicals - Building Systems; Kure 200.
c. ChemMasters; Safe-Cure Clear.
d. Conspec by Dayton Superior; W.B. Resin Cure.
e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
f. Edoco by Dayton Superior; Res X Cure WB.
g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
h. Kaufman Products, Inc.; Thinfilm 420.
i. Lambert Corporation; AQUA KURE - CLEAR.
j. L&M Construction Chemicals, Inc.; L&M Cure R.
k. Meadows, W. R., Inc.; 1100-CLEAR.
l. Nox-Crete Products Group; Resin Cure E.
m. Right Pointe; Clear Water Resin.
n. SpecChem, LLC; Spec Rez Clear.
o. Symons by Dayton Superior; Resi-Chem Clear.
p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Silica Fume: 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: See Structural Drawings.
2. Maximum Water-Cementitious Materials Ratio: See Structural Drawings.
3. Slump Limit: See Structural Drawings.
4. Air Content:5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: See Structural Drawings.
2. Maximum Water-Cementitious Materials Ratio: See Structural Drawings.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: See Structural Drawings.
2. Minimum Cementitious Materials Content: See Structural Drawings.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

D. Concrete Toppings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
2. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
3. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished toppings to exceed 3 percent.

6. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd. (0.90 kg/cu. m).

2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to

prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

C. Granular Course: Cover vapor retarder with specified sand cushion, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed

waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water.

Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

1. Apply scratch finish to surfaces indicated and surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
    a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and to where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.14 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

3.17 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 03 35 00

POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Polished concrete.

B. Dyed and polished concrete.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 07 92 00 - Joint Sealants.

1.3 REFERENCES

A. American Concrete Institute (ACI): ACI 302.1R - Guide for Concrete Floor and Slab Construction.

B. American National Standards Institute (ANSI): Standards B-101.1/2009.

C. ASTM International (ASTM):
1. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
2. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete.
3. ASTM C 779 - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.

D. National Floor Safety Institute (NFSI): NFSI Test Method 101-A - Standard for Evaluating High-Traction Flooring Materials.

1.4 SYSTEM DESCRIPTION

A. Performance Requirements: Provide polished flooring that has been designed, manufactured and installed to achieve the following:
1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
2. Reflectivity: Increase of 35% as determined by standard gloss meter.
3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
4. High Traction Rating: NFSI 101-A, ANSI B-101.1 2009 non-slip properties.

B. Design Requirements:
1. Hardened Concrete Properties:
a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
b. Normal Weight Concrete: No lightweight aggregate.
c. Non-air entrained.
2. Placement Properties:

a. Natural concrete slump of 4-1/2 inches to 5 inches (114 to 127 mm). Admixtures may be used.
b. Flatness Requirements:
1) Overall FF 50.
2) Local FF 40.

3. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.
a. Class 6 floors, special colored mineral aggregate hardener with repeated hard steel trowel finish.

4. Curing Options:
a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure). 1) Acrylic curing and sealing compounds not recommended.
b. Sheet membrane (ASTM C171); polyethylene film not recommended.
c. Damp Curing: Seven day cure.

1.5 SUBMITTALS

A. Shop Drawings: Indicate information on shop drawings as follows:
1. Accurately scaled, CAD drawn, project specific layout plans showing all floor areas and curbs, stairs, etc. to receive finishing including dimensions and floor grinding schedule.
2. Plan shall indicate joint pattern layout, areas to receive colored surface treatment.
3. Plan shall indicate areas to receive hardener, sealer, densifier clearly identified and notated.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
1. Material Safety Data Sheets (MSDS).
2. Preparation and concrete grinding procedures.
3. Colored Concrete Surface, Dye Selection Guides.

C. Quality Assurance Submittals:
1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in Performance Requirements.
2. Certificates:
a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A. ANSI B-101.1 2009 non-slip properties.
c. Current contractor's certificate signed by manufacturer declaring Contractor as an approved installer of polishing system.
3. Manufacturer's Instructions: Manufacturer's installation instructions.

D. Warranty: Submit warranty documents specified.

E. Operation and Maintenance Data: Submit operation and maintenance data for installed products.
1. Manufacturer's instructions on maintenance renewal of applied treatments.
2. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.6 QUALITY ASSURANCE

A. Concrete finishing components and materials shall be from single manufacturer.

B. Mock-Ups:
1. Mock-Up Size: 100 sf (9.3 m2) sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
2. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
3. Allow 24 hours for inspection of mock-up before proceeding with work.
4. When accepted, mock-up will demonstrate minimum standard of quality required for this work.
   a. Approved mock-up may not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Architect.
5. Mock-Up will demonstrate required level of cut:
   a. Level 1 - Cream Finish: Polishing only the Portland Cement paste at the surface without exposing small, medium or large aggregate. Note: If dye will be used, this is not an acceptable level of grinding. Go to Level 2.
   b. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
   c. Level 3 - Medium Aggregate: Exposing more of the overall girth of the coarse aggregate within the concrete. Generally, this level of cut can be achieved within 1/8" of the surface.
   d. Level 4 - Large Aggregate: Exposing the overall girth of the coarse aggregate within the concrete. This level of cut generally can be achieved within 1/4" of the surface.
   e. Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60.
   f. Sheen Level B: Sheen (high gloss) as determined by a gloss reading of 60 - 70.
   g. Sheen Level C: Sheen (very high gloss) as determined by a gloss reading of 70 or higher.

C. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:
1. Environmental requirements.
2. Scheduling and phasing of work.
3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
4. Protection of adjacent surfaces.
5. Surface preparation.
6. Repair of defects and defective work prior to installation.
7. Cleaning.
8. Installation of polished floor finishes.
9. Application of liquid hardener, densifier.
10. Protection of finished surfaces after installation.
11. placing of materials on the concrete surface that may cause staining, etching or scratching

1.7 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original packaging with identification labels and seals intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Protect Concrete Slab:
1. Protect from petroleum stains during construction.
2. Diaper hydraulic power equipment.
3. Restrict vehicular parking.
4. Restrict use of pipe cutting machinery.
5. Restrict placement of reinforcing steel on slab.
6. Restrict use of acids or acidic detergents on slab.

C. Waste Management and Disposal:
1. Separate waste materials for Reuse and Recycling in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
2. Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.9 PROJECT AMBIENT CONDITIONS

A. Installation Location: Comply with manufacturer's written recommendations.

1.10 SEQUENCING

A. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

1.11 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: L&M Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email:request info (info@lmcc.com); Web:www.laticrete.com/lmcc

B. Or approved Equal.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 POLISHED CONCRETE

A. Products/Systems:
1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
   a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus. Basis of design.
   b. Acceptable Material: L&M Construction Chemicals, Inc., Lion Hard may be substituted when conditions exist where disposing of rinse water is in conflict with local building codes.
2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
   a. Acceptable Material: L & M Construction Chemicals, Inc., Joint Tite 750 or approved equal
3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
   a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex or approved equal.
4. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with water or VOC exempt solvent; formulated for application to polished cementitious surfaces.
   a. Acceptable Material: L & M Construction Chemicals, Inc., Vivid Concrete Dyes or Vivid Dye WB Plus or approved equal.
   b. Color: to match Architects Selection.
5. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).
   a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner or approved equal.
6. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.
   a. Acceptable Material: L& M Construction Chemicals, Inc. Permaguard SPS or approved equal.
7. Finish: Standard High gloss (HG-1), 1500 grit.
8. Finish: Medium gloss (MG-2), 800.
9. Finish: Very high gloss (VGH-3), 3000 grit.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Verify Concrete Slab Performance Requirements:
1. Verify concrete is cured to 28 day duration and 3500 psi (24 MPa) strength.
2. Verify concrete surfaces have received a hard steel-trowel finish (3 passes) during placement.
3. Verify overall floor flatness is a minimum of Ff 40.

3.2 PREPARATION

A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.

B. Examine surface to determine soundness of concrete for polishing.

3.3 INSTALLATION

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions.

B. Floor Surface Polishing and Treatment:
1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
2. Apply floor finish prior to installation of fixtures and accessories.
3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
    a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
    b. Expose aggregate in concrete surface only as determined by approved mock-up.
    c. All concrete surfaces shall be as uniform in appearance as possible.
4. Dyed and Polished Concrete:
    a. Locate demarcation line between dyed surfaces and other finishes.
    b. Polish concrete to the 400 grit level, (200 grit for water based dyes).
    c. Apply pre-mixed dyes to polished concrete surface.
    d. Allow dye to dry.
    e. Remove residue with water and buffer pad; reapply as necessary for desired result.

5. Hardener and Densifier Application:
   a. First coat of FGS Hardener Plus at 250 ft2/gal (6.25 m2/L), following the 400 grit level. (Lion Hard at 400-600 sq ft / gallon).
   b. Second coat of FGS Hardener Plus at 350 ft2/gal (8.75 m2/L), prior to the final polishing pass (Lion Hard at 600-800 sq ft / gallon).
   c. Follow manufacturer's recommendations for drying time between successive coats.
6. Remove defects and re-polish defective areas.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.4 ADJUSTMENTS

A. Re-polish those areas not meeting specified gloss levels per mock-up.

B. Fill joints flush to surface prior to the start of polishing operations.

3.5 FINAL CLEANING

A. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.6 PROTECTION

A. Protect installed product from damage during construction in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Prefabricated building columns.
3. Grout.

B. Related Sections:

1. Section 014000 "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
3. Division 9 for surface-preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or “SFRS” or along grid lines designated as "SLRS" or “SFRS” on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches (38 mm).
2. Welded built-up members with plates thicker than 2 inches (50 mm).
3. Column base plates thicker than 2 inches (50 mm).

D. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

F. AESS: Structural Steel designated as “Architecturally Exposed Structural Steel” in the contract documents and conforming to ANSI/AISC 303-16, Chapter 10 requirements.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360.
2. Use LRFD; data are given at factored-load level.

B. Moment Connections: Type PR, partially restrained.

C. Construction: Moment frame.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
1. Structural steel materials
2. High strength bolt-nut-washer assemblies
3. Anchor rods
4. Threaded rods
5. Galvanized steel primer
6. Shrinkage resistant grout

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Laboratory Test Reports for Credit IEQ 4: For primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand critical welds.
8. Identify members as AESS.

D. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Mill test reports for structural steel, including chemical and physical properties.

D. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

E. Source quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator: A fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer: A installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE.

C. Welding Qualifications: Qualify procedures according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass supplemental welder testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes.

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.9 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than the following:

1. W-Shapes: 60 percent.
2. Channels, Angles: 60 percent.
3. Plate and Bar: 25 percent.
4. Cold-Formed Hollow Structural Sections: 25 percent.
5. All Other Steel Materials: 25 percent.

B. W-Shapes: ASTM A 992/A 992M Grade 50 (345)

C. Channels, Angles: ASTM A 36/A 36M.

D. Plate and Bar: ASTM A 36/A 36.

E. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50 (345).

F. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

G. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.

H. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: Standard, Extra strong, Double-extra strong.
2. Finish: Black except where indicated to be galvanized.

I. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.

J. Steel Forgings: ASTM A 668/A 668M.

K. Welding Electrodes: Comply with AWS requirements.

L. AESS: All elements designated as Architecturally Exposed Structural Steel shall conform to AESS Category 3. These are feature elements viewed at a distance less than 20 feet. The art of metalworking is intended to be visible to the viewer.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 490 (ASTM F 959M, Type 10.9), compressible-washer type with plain finish.

C. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.

D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

E. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Straight.
2. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
5. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

F. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
4. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

G. Threaded Rods: ASTM A 36/A 36M

1. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
3. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

H. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

I. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

J. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.3 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: Comply with Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."

C. Primer: SSPC-Paint 25, Type I or Type II, zinc oxide, alkyd, linseed oil primer.

D. Primer: SSPC-Paint 25 BCS, Type I or Type II, zinc oxide, alkyd, linseed oil primer.

E. Primer: SSPC-Paint 23, latex primer.

F. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

G. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning; SSPC-SP 2, "Hand Tool Cleaning; SSPC-SP 3, "Power Tool Cleaning".

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.

H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches (250 mm) o.c. unless otherwise indicated.

I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, Slip critical.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
5. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."

6. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
8. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
9. SSPC-SP 8, "Pickling."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, shelf angles, welded door frames attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connection.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" Section 099123 "Interior Painting."

END OF SECTION 051200

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Steel ladders.
2. Ladder safety cages.
3. Loose bearing and leveling plates.
4. Steel framing and supports for operable partitions.
5. Steel girders for supporting wood frame construction.
6. Steel framing and supports for mechanical and electrical equipment.
7. Steel framing and supports for applications where framing and supports are not specified in other Sections.

B. Related Sections include the following:

1. Division 5 Section "Structural Steel Framing" for structural-steel framing system components.
2. Division 6 Section "Rough Carpentry" for metal framing anchors and other rough hardware.
3. Division 6 Section "Structural Glued-Laminated Timber" for timber connectors and other rough hardware.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Paint products.
3. Grout.

B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. Provide templates for anchors and bolts specified for installation under other Sections.

C. Samples for Verification: For each type and finish of extruded nosing and tread.

D. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.

E. Welding Certificates: Copies of certificates for welding procedures.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

F. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

G. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

H. Slotted Channel Framing: Cold-formed metal channels with flange edges returned toward web and with 9/16-inch wide slotted holes in webs at 2 inches o.c.

1. Width of Channels: As indicated on drawings.
2. Depth of Channels: As indicated on drawings.
3. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33, with G90 coating; 0.045-inch nominal thickness and less.
4. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 50, with G90 coating; 0.056-inch nominal thickness and greater.

I. Malleable-Iron Castings: ASTM A 47, Grade 32510.

J. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

K. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

L. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 ALUMINUM

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.

B. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, alloy 6061-T6.

2.4 PAINT

A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."

B. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

C. Shop Primer for Ferrous Metal: Organic zinc-rich primer, complying with SSPC-Paint 20 and compatible with topcoat.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Carboline 621; Carboline Company.
b. Aquapon Zinc-Rich Primer 97-670; PPG Industries, Inc.
c. Tneme-Zinc 90-97; Tnemec Company, Inc.

D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.

G. Plain Washers: Round, carbon steel, ASME B18.22.1.

H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.6 GROUT

A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.7 CONCRETE FILL

A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.8 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.9 STEEL LADDERS

A. General: Fabricate ladders for locations shown, with dimensions, spacings, details, and anchorages as indicated.

1. Comply with ANSI A14.3, unless otherwise indicated.
2. For elevator pit ladders, comply with ASME A17.1.

B. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges, spaced 16 inches apart.

C. Bar Rungs: 3/4-inch diameter steel bars, spaced 12 inches o.c.

D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.

E. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets. Size brackets to support design loads specified in ANSI A14.3.

F. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

G. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Mebac; IKG Borden.
b. SLIP-NOT; W. S. Molnar Company.

H. Galvanize ladders, including brackets and fasteners, in the following locations:

1. Exterior.
2. Interior, where indicated.

2.10 LADDER SAFETY CAGES

A. General: Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or riveting.

B. Primary Hoops: 5/16-by-4-inch steel flat bar hoops. Provide at tops and bottoms of cages and spaced not more than 20 feet o.c.

C. Secondary Intermediate Hoops: 5/16-by-2-inch steel flat bar hoops, spaced not more than 48 inches o.c. between primary hoops.

D. Vertical Bars: 5/16-by-2-inch steel flat bars secured to each hoop, spaced approximately 9 inches o.c.

E. Fasten assembled safety cage to ladder rails and adjacent construction by welding or riveting, unless otherwise indicated.

F. Galvanize ladder safety cages, including fasteners, in the following locations:

1. Exterior.
2. Interior, where indicated.

2.11 STEEL SHIP'S LADDERS

A. Provide ship's ladders where indicated. Fabricate of open-type construction with structural-steel channel or steel plate stringers, steel pipe handrails, and steel bar grating treads, unless otherwise indicated. Provide brackets and fittings for installation.

1. Comply with applicable requirements in Division 5 Section "Pipe and Tube Railings" for steel pipe railings.

B. Galvanize ship's ladders, including brackets and fasteners, in the following locations:

1. Exterior.
2. Interior, where indicated.

2.12 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates after fabrication.

2.13 LOOSE STEEL LINTELS

A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

B. Weld adjoining members together to form a single unit where indicated.

C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches, unless otherwise indicated.

D. Galvanize loose steel lintels located in exterior walls.

2.14 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete. Align expansion joints in angles with indicated control and expansion joints in cavity-wall exterior wythe.

C. Galvanize shelf angles to be installed in exterior walls.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.15 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.

B. General: Provide steel framing and supports indicated and as necessary to complete the Work.

C. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate units from slotted channel framing where indicated.
2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches wide by 1/4 inch thick by 8 inches long at 24 inches o.c., unless otherwise indicated.
3. Furnish inserts if units must be installed after concrete is placed.

D. Fabricate supports for operable partitions as follows:

1. Beams: Continuous steel shapes of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

E. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.

1. Provide bearing plates welded to beams where indicated.
2. Drill girders and plates for field-bolted connections where indicated.
3. Where wood nailers are attached to girders with bolts or lag screws, drill holes at 24 inches o.c.

F. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness, unless otherwise indicated.

1. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.

G. Galvanize miscellaneous framing and supports where indicated.

2.16 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.

C. Galvanize miscellaneous steel trim in the following locations:

1. Exterior.
2. Interior, where indicated.

2.17 STRUCTURAL-STEEL DOOR FRAMES

A. Fabricate steel door frames from structural shapes and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches o.c. Reinforce frames and drill and tap as necessary to accept finish hardware.

B. Provide steel strap anchors, 1/8 by 2 inches, with a minimum 6-inch embedment and 2-inch hook, unless otherwise indicated, for securing door frames into adjoining concrete or masonry.

Weld anchors to frame jambs no more than 12 inches from both bottom and head of frame, and space anchors not more than 30 inches apart.

C. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.

D. Galvanize frames in the following locations:

1. Exterior.
2. Interior, where indicated.

2.18 CAST NOSINGS, TREADS, AND THRESHOLDS

A. Fabricate units of metal indicated below in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Provide units with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both.

1. Metal: Cast gray iron, Class 20.
2. Metal: Cast aluminum.
3. Metal: Cast bronze (leaded red or semi-red brass).
4. Metal: Cast nickel silver (leaded nickel bronze).

B. Configurations: Provide units in the following configurations, unless otherwise indicated:

1. Nosings: Cross-hatched units, 4 inches wide with 1/4-inch lip, for casting into concrete steps.
2. Nosings: Cross-hatched units, 4 inches wide with 1-inch lip, for casting into concrete steps.
3. Nosings: Cross-hatched units, 1-1/2 by 1-1/2 inches, for casting into concrete curbs.
4. Treads: Cross-hatched units, full depth of tread with 3/4-by-3/4-inch nosing, for application over bent plate treads or existing stairs.
5. Thresholds: Fluted-saddle-type units, 5 inches wide by 1/2 inches high, with tapered edges.
6. Thresholds: Fluted-interlocking- (hook-strip) type units, 5 inches wide by 5/8 inches high, with tapered edge.
7. Thresholds: Plain-stepped (stop) type, 5 inches wide by 1/2 inch high, with 1/2-inch step.

C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

D. Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.

1. Provide two rows of holes for units more than 5 inches wide, with two holes aligned at ends and intermediate holes staggered.

E. Apply bituminous paint to concealed bottoms, sides, and edges of units set into concrete.

F. Provide a plain surface texture, unless fluted or cross-hatched surfaces are indicated.

G. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Safety Tread Co., Inc.
2. Amstep Products.
3. Armstrong Products, Inc.
4. Balco/Metalines, Inc.
5. Granite State Casting Co.
6. Safe-T-Metal Co.
7. Wooster Products Inc.

2.19 EXTRUDED NOSINGS AND TREADS

A. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Provide extruded-aluminum units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder.

1. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
2. Provide solid-abrasive-type units without ribs.

B. Configurations: Provide units in the following configurations, unless otherwise indicated:

1. Nosings: Units, 3 inches wide, for casting into concrete steps.
2. Nosings: Units, 3 inches wide with 1-3/8-inch lip, for surface mounting on existing stairs.
3. Nosings: Two-piece units, 3 inches wide, with subchannel for casting into concrete steps.
4. Treads: Square-back units, full depth of tread with 1-3/8-inch lip, for application over existing stairs.
5. Treads: Beveled-back units, full depth of tread with 1-3/8-inch lip, for application over existing stairs.

C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

D. Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.

1. Provide two rows of holes for units more than 5 inches wide, with two holes aligned at ends and intermediate holes staggered.

E. Apply clear lacquer to concealed bottoms, sides, and edges of units set into concrete.

F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Safety Tread Co., Inc.
2. Amstep Products.
3. Armstrong Products, Inc.
4. Balco/Metalines, Inc.
5. Granite State Casting Co.
6. Safe-T-Metal Co.
7. Wooster Products Inc.

2.20 PIPE GUARDS

A. Provide pipe guards of 3-by-3-by-5/16-inch steel angles, extending from floor to 42 inches above floor, with 3/8-inch steel baseplates for bolting to floor. Provide at least two vertical angles at each location, except at internal corners where one may be used. Connect tops of angles and anchor to wall or column with 1/4-by-2-inch steel strap braces welded to angles and bolted to wall.

B. Galvanize pipe guards after fabrication.

2.21 WHEEL GUARDS

A. Provide wheel guards of 3/4-inch thick, hollow-core, gray-iron castings; of size and shape indicated. Provide holes for countersunk anchor bolts and grouting.

2.22 PIPE BOLLARDS

A. Fabricate pipe bollards from Schedule 40 steel pipe.

B. Fabricate pipe bollards from Schedule 80 steel pipe.

1. Cap bollards with 1/4-inch minimum steel plate.

C. Fabricate bollards with 3/8-inch thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

D. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch thick steel plate welded to bottom of sleeve.

E. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 1/2-inch steel machine bolt.

2.23 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.24 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.25 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

C. Bright, Directional Polish: No. 4 finish.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.26 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 SETTING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated at girders supported on concrete or masonry, install as specified above for setting and grouting bearing and leveling plates.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified above for setting and grouting bearing and leveling plates.

1. Do not grout baseplates of columns supporting steel girders until girders are installed and leveled.

3.4 INSTALLING PREFABRICATED BUILDING COLUMNS

A. Install prefabricated building columns to comply with AISC S335 and with requirements of the testing and inspecting agency that apply to fire-resistance rating indicated.

3.5 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

A. Install with anchorage system indicated to comply with manufacturer's written instructions.

B. Center nosings on tread widths.

C. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

D. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 7 Section "Joint Sealants" to provide a watertight installation.

3.6 INSTALLING PIPE GUARDS

A. Install pipe guards at exposed vertical pipes in parking garage where not protected by curbs or other barriers. Install by bolting to floor and wall or column with drilled-in expansion anchors.

3.7 INSTALLING WHEEL GUARDS

A. Anchor wheel guards to concrete or masonry construction to comply with manufacturer's written instructions. Fill cores solidly with concrete.

3.8 INSTALLING PIPE BOLLARDS

A. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solidly with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

B. Anchor bollards in concrete in formed or core-drilled holes not less than 8 inches deep and 3/4 inch greater than OD of bollard. After bollards have been inserted into holes, fill annular space surrounding bollard solidly with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

C. Anchor bollards in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured.

D. Anchor bollards to existing construction with postinstalled anchors and bolts. Provide four 3/4-inch anchors at each bollard, unless otherwise indicated. Embed anchors at least 4 inches in existing concrete.

E. Anchor internal sleeves for removable bollards in concrete by inserting into pipe sleeves preset into concrete. After internal sleeves have been inserted, fill annular space between sleeves solidly with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.

F. Anchor internal sleeves for removable bollards in formed or core-drilled holes not less than 8 inches deep and 3/4 inch greater than OD of sleeve. After sleeves have been inserted into holes, fill annular space surrounding sleeves solidly with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward sleeve.

G. Anchor internal sleeves for removable bollards in place with concrete footings. Support and brace sleeves in position in footing excavations until concrete has been placed and cured.

    1. Place removable bollards over internal sleeves and secure with 1/2-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish padlocks.

H. Fill bollards solidly with concrete, mounding top surface.

    1. Do not fill removable bollards with concrete.

3.9 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05500

SECTION 05 51 50
METAL ACCESS LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Aluminum fixed vertical ladders.

1.2 RELATED SECTIONS
A. Section 051200 - Structural Steel Framing: Roof structure and opening support.
B. Section 055000 - Metal Fabrications: Miscellaneous metal supports.
C. Section 061000 - Rough Carpentry: Roof framing and opening support.
D. Section 075419.11 – Adhered Thermoplastic PVC Membrane Roofing

1.3 REFERENCES
A. ANSI A14.3: Ladders - Fixed - Safety Requirements.
B. OSHA 1910.27: Fixed Ladders.

1.4 SUBMITTALS
A. Submit under provisions of Section 013300.v
B. Product Data : Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings for Ladders:
   1. Plan and section of ladder installation for each specific application. Drawings must be accurate and drawn to scale indicating all sizes, dimensions, attachments, and finishes.
   2. Shop drawings must indicate all anchorage in coordination with architectural and structural drawings.
   3. Installer must field verify each application and include field verified dimensions and substrate information with shop drawings.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store products until installation inside under cover. If stored outside, under a tarp or suitable cover.

1.6 WARRANTY
A. Manufacturers Limited Warranty: Five years against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.
B. Installer Warranty: Five years for all components, attachments, and operations related to installed access ladders.

PART 2 PRODUCTS

2.1 MANUFACTURER
Basis of Design: Precision Ladders, LLC, Morristown, TN, 800-225-7814, www.PrecisionLadders.com

A. Or approved Equal

2.2 ALUMINUM FIXED VERTICAL LADDER

A. Aluminum Fixed Vertical Ladder and Components: Ladder, cage, rest platforms, floor mounting brackets, security doors, walk-thru, and side rails.
   1. Model: Model FL -*** (***= vertical height in inches) Aluminum Fixed Vertical Ladder as manufactured by Precision Ladders LLC.
   2. Capacity: Unit shall support a 1500 lb (680 kg) loading without failure, and individual treads shall withstand a 3,000 lb (1361 kg) loading without failure.
   3. Performance Standard: Units designed and manufactured to meet or exceed ANSI A14.3 and OSHA 1910.27.

B. Components:
   1. Ladder Stringer: 2-1/2 inch by 1-1/16 inch by 1/8 inch (64 mm by 27 mm by 3 mm) extruded 6005-T5 aluminum channel. Pitch: 90 degrees.
   2. Ladder Tread: 2-1/4 inch by 3/4 inch by 1/4 inch (57 mm by 19 mm by 6 mm) extruded 6005-T5 aluminum with deeply serrated top surface.
   3. Ladder Mounting Bracket: 8-1/2 inch by 2 inch by 3 inch by 1/4 inch thick (216 mm by 51 mm by 76 mm by 6 mm) aluminum angle.
   4. Walk-Thru:
      a. Hand Rails: 1-1/4 inch (32 mm) aluminum square tube with rounded edges.
      b. Mounting Brackets: 4 inch by 4 inch by 1/4 inch (102 mm by 102 mm by 6 mm) aluminum.
      c. Side Rails: 42 inch (1067 mm) side rail extension for through ladder exits.
   5. Rest Platform:
      a. 1/8 inch (3 mm) aluminum tread plate.
      b. Platform Size: 30” inches by 48 inches (762 mm by 1219 mm) standard.
      c. Toe Boards. 6005 T-5 aluminum.
      d. Handrails: 1-1/4 inch (32 mm) aluminum square tube 42 inches (1067 mm) high.
   6. Security Door: 0.125 inch (3 mm) 3003-H14 aluminum panel 84 inches (2134 mm) tall with padlock provision.
   7. Finishes:
      a. Powder Coated, Color selected from manufacturer’s standard RAL colors.

2.3 FABRICATION

A. Completely fabricate ladder ready for installation before shipment to the site.

B. Completely fabricate handrail components and ship to site ready for field assembly and attachment to ladder.

PART 3 EXECUTION

3.1 EXAMINATION

A. If substrate preparation is the responsibility of another installer, notify General

Contractor of unsatisfactory preparation before proceeding.

B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 05 73 13

DECORATIVE PERFORATED PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Laser cut decorative perforated metal panels
   2. Steel metal panel support frames

1.2 RELATED REQUIREMENTS

A. Embedded anchorage plates, structural connections, Coordinate support sizes and locations.

1.3 RELATED SECTIONS

A. Section 05 50 00 “Metal Fabrications
B. Section 08 71 00 “Door Hardware”

1.4 SUBMITTALS

A. Product Data: Supplier’s data sheets on each product to be used including:
   1. Preparation instructions and recommendations
   2. Storage handling requirements and recommendations
   3. Description of materials, components, fabrication, and finishes.

B. LEED Submittals:
   1. Product Data for Credits EA1, MR 3.1, MR 3.2, MR 4.1, MR 4.2, MR 5.1, MR 5.2, EQ 4.1, EQ 4.2 and EQ 7.1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: Including plans, elevations, sections and details indicating materials, components, sizes, dimensions, tolerances, hardware, fasteners, finishes, options, accessories and installation methods. Provide details of attaching metal panels to support frames.

D. Verification Samples: For product specified, provide two 3”x 6” Samples of powder coat color chips for finish on each material.

E. Pattern Samples: One 12”x12” flat panel, without finish. Pattern Scaling may vary, depending on selection.

F. Closeout Submittals: Supplier’s maintenance and cleaning instructions and warranty.

1.5 QUALITY ASSURANCE

A. Mock-up: Build mock-up to verify sections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1.6 PROJECT CONDITIONS

A. Installer to verify actual locations of walls and other construction contiguous with metal panels by field measurements before fabrication and indicate measurements on shop drawings. Coordinate construction to ensure that panels and assemblies conform to built openings.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials in manufacturer's original packaging with corresponding labels and identifying information.
   1. Unload, store, and erect panel assemblies in a manner to prevent bending, warping, twisting, and surface damage.

B. Storage and Handling Requirements.
   1. Store Panels vertically, covered with appropriate weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
   2. Do not stack pallets. Panels that are stacked need to be protected from each successive panel above and below.
   3. Avoid overhandling and excessively moving panels in order to maintain protective packaging.

PART 2 - PRODUCTS

2.1 DECORATIVE PERFORATED PANEL SUPPLIER

A. Bok Modern Inc. San Francisco, CA 94109 415-749-6500 info@bokmodern.com / www.bok.modern.com

B. Or Approved Equal

2.2 MATERIALS

A. Fasteners for anchoring metal panels to other construction: Select Fasteners of type, grad and class required to produce connection indicated and capable of withstanding design loads.

B. Fasteners for Interconnecting Metal Panel Components: Use fasteners fabricated from basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or non-compatible with materials joined. Avoid fastening dissimilar materials, separate with isolating hardware where necessary.

C. Brackets, Flanges and Anchors: Same metal and finish as supported metals unless otherwise indicated.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.3 ORNAMENTAL PERFORATED METAL PANELS

A. Metal Surfaces: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations or blemishes, unless allowed for specific metal types and finishes.

B. Perforated Cold Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel Type B, 0.074-inch (1.88mm) thick

C. Laser Cut Proprietary Pattern: Bok Modern Pattern: C9

2.4 FABRICATION

A. Fabricate metal panel assemblies to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than required to support structural loads.

B. Fabricate systems in accordance with approved shop drawings and the supplier's instructions. Form work tru to line and level with accurate angles and surfaces.

C. Assemble metal panels in the shop to greatest extent possible to minimize field splicing and assembly.

D. Cut, Drill and laser cut metal cleanly and accurately. Remove burrs, and ease edges; unless allowed for specific metal types and finishes. Remove sharp or rough areas on exposed surfaces.

E. Cut, Reinforce, Drill and Tap as indicated to receive finish hardware, screws and similar items.

F. Use grommets, bushings and washers or methods as recommended by the supplier for separation of dissimilar metals.

2.5 FINISHES

A. Comply with NAAMM's MFM for recommendations for applying and designated finishes.

B. Appearance of Finished Work
   1. Variations in appearance of other components area acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.6 FINISHES FOR ALUMINUM

A. Powder Coating: Tiger Dryac 38 with primer- 2 coat system. Pretreat according to AAMA 2604; to withstand a minimum of 3000hrs. ASTM B117 or 700 hrs ASTM G85 Annex A2. Apply TIGER 60/70000 at minimum of 2.0 mils 50% or less cure to ensure proper inter coat adhesion to topcoat. Apply TIGER Series 38 AAMA 2604 compliant topcoat at a minimum of 2.5 mils and process according to supplier's recommendations.
   1. Color to match:
      a. Manufacturer: Benjamin Moore & Co.
      b. Color: #2128-10 Black Beauty
   2. Texture: Fine Texture

2.7 FINISHES FOR STEEL

A. Powder Coating: Tiger Drylac 38 with primer- 2 coat system. Pretreat according to AAMA 2604; to withstand a minimum of 3000hrs. ASTM B117 or 700hrs ASTM G85 Annex A2. Apply TIGER 60/70000 at minimum of 2.0 mils 50% or less cure to ensure proper inter coat adhesion to topcoat. Apply TIGER Series 38 AAMA 2604 compliant topcoat at a minimum of 2.5 mils and process according to supplier's recommendations.
   1. Color to match:
      a. Manufacturer: Benjamin Moore & Co.
      b. Color: #2128-10 Black Beauty
   2. Texture: Fine Texture

B. Stainless Steel
   1. Polish Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches
   2. Run grain of directional finishes with long dimension of each piece.
      a. Directional Satin Finish: No. 4
   3. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared

B. Installer to verify field measurements are acceptable to suit assembly tolerances

C. Installer to verify supports and anchors are correctly positioned and set.

3.2 PREPARATION

A. Provide items required to be cast into concrete or embedded in masonry with setting templates.

B. Installer to take field measurements after permanent end terminations are in palace and prior to preparation of shop drawings and fabrication, to ensure fitting of work.

C. Prepare surfaces using the methods recommended by the supplier of the achieving the best result for the substrate under the Project conditions.

3.3 INSTALLATION

A. Install metal panels plumb, level, square, true to line and rigid, fit exposed connections together to form tight, hairline joints.

B. Adjust metal panels before anchoring to ensure alignment at abutting joints.

C. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Use supplier's supplied hardware for panel to panel connections.

E. Attach metal panels securely in place using anchorage devices and fasteners as indicated by EOR.

F. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

3.4 ADJUSTING

A. Touch up, repair, or replace damaged products before Substantial Completion. Manufacturer to provide proper coating for repainting any exposed steel surfaces.

B. Return items that cannot be refinished in the field.

3.5 CLEANING

A. Clean metal panels with water and light detergent promptly after installation in accordance with supplier's instructions.

B. Do not use harsh cleaning materials or methods that will damage finish.

C. Do not use abrasive cleaners.

3.6 PROTECTION

A. Protect finishes of metal panels from damage during construction period with temporary protective coverings approved by metal panel supplier. Remove protective coverings at the time of Substantial Completion.

B. Replace defective or damaged components. Restore finishes damage during installation and construction period so no evidence remains of correction work.

C. Touch up, repair or replace damaged products before Substantial Completion. Return items that cannot be refinished in field to shop; make required alterations and refinish entire assembly or provide new assembly.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Rooftop equipment bases and support curbs.
5. Wood blocking and nailers.
6. Utility shelving.
7. Wood furring.
8. Sheathing.
9. Subflooring and underlayment.
10. Plywood backing panels.
11. Building wrap.

B. Related Sections include the following:

1. Division 6 Section "Structural Glued-Laminated Timber."

1.3 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Exposed Framing: Dimension lumber not concealed by other construction.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. RIS - Redwood Inspection Service.
4. SPIB - Southern Pine Inspection Bureau.
5. WCLIB - West Coast Lumber Inspection Bureau.
6. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Foam-plastic sheathing.
5. Power-driven fasteners.
6. Powder-actuated fasteners.
7. Expansion anchors.
8. Metal framing anchors.
9. Building wrap.

1.5 QUALITY ASSURANCE

A. Testing Agency: An independent testing agency, acceptable to authorities having jurisdiction, will conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.

C. Source Limitations for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Laminated-Veneer Lumber:

    a. Boise Cascade Corporation.
    b. Georgia-Pacific Corporation.
    c. Louisiana-Pacific Corporation.
    d. Pacific Woodtech Corp.
    e. Trus Joist MacMillan.
    f. Union Camp Corp.; Building Products Division.
    g. Willamette Industries, Inc.

2. Parallel-Strand Lumber:

    a. Trus Joist MacMillan.
    b. Weyerhaeuser Company

3. Prefabricated Wood I-Joists:

    a. Boise Cascade Corporation.
    b. Georgia-Pacific Corporation.
    c. Louisiana-Pacific Corporation.
    d. Pacific Woodtech Corp.
    e. Poutrelles International Inc.
    f. Standard Structures Inc.
    g. Stark Truss Company, Inc.
    h. Superior Wood Systems, Inc.
    i. Trus Joist MacMillan.
    j. Union Camp Corp.; Building Products Division.
    k. Willamette Industries, Inc.

4. Gypsum Sheathing Board:

    a. American Gypsum Co.
    b. G-P Gypsum Corporation.
    c. National Gypsum Company.
    d. United States Gypsum Co.

5. Extruded-Polystyrene-Foam Wall Sheathing:

    a. DiversiFoam Products.
    b. Dow Chemical Company (The).
    c. Owens Corning.
    d. Tenneco Building Products.

6. Polyisocyanurate-Foam Wall Sheathing:

    a. Apache Products Company.
    b. Celotex Corporation (The); Building Products Division.
    c. Rmax, Inc.

7. Building Wrap:

    a. Celotex Corporation (The); Building Products Division.
    b. DuPont (E. I. du Pont de Nemours and Company).
    c. Parsec, Inc.
    d. Raven Industries, Inc.
    e. Reemay, Inc.
    f. Simplex Products.
    g. Sto-Cote Products, Inc.
    h. Tenneco Building Products.

8. Metal Framing Anchors:

    a. Alpine Engineered Products, Inc.
    b. Cleveland Steel Specialty Co.
    c. Harlen Metal Products, Inc.
    d. KC Metals Products, Inc.
    e. Silver Metal Products, Inc.
    f. Simpson Strong-Tie Company, Inc.
    g. Southeastern Metals Manufacturing Co., Inc.
    h. United Steel Products Company, Inc.

2.2 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.
5. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

6. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Wood Structural Panels:

1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
2. Oriented Strand Board: DOC PS 2.
3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
4. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
5. Factory mark panels according to indicated standard.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:

a. Chromated copper arsenate (CCA).
b. Ammoniacal copper zinc arsenate (ACZA).
c. Ammoniacal, or amine, copper quat (ACQ).
d. Copper bis (dimethyldithiocarbamate) (CDDC).
e. Ammoniacal copper citrate (CC).
f. Copper azole, Type A (CBA-A).
g. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 18 inches (460 mm) above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.4 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Grade and species indicated on drawings.

C. Exterior and Load-Bearing Walls: Grade and species indicated on drawings.

D. Joists, Rafters, and Other Framing Not Listed Above: Paragraph below is an example for machine stress-rated lumber that can be used instead of paragraph above or performance requirement below. If retaining, select or insert grade to suit structural requirements of Project. Three grades listed are most commonly available.

2.5 TIMBER

A. For timber of 5-inch nominal (117-mm actual) size and thicker, provide material complying with the following requirements:

1. Grading Agency: West Coast Lumber Inspection Bureau (WCLIB).

2. Grading Agency: Western Wood Products Association (WWPA

3. Sizes: Nominal sizes as indicated on drawings.

4. Moisture Content: S-dry (19 percent maximum)

2.6 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Rooftop equipment bases and support curbs.
2. Blocking.
3. Cants.
4. Nailers.

5. Furring.
6. Grounds.

B. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 ENGINEERED WOOD PRODUCTS

A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product has the following allowable design values as determined according to ASTM D 5456:

1. Extreme Fiber Stress in Bending, Edgewise: as indicated on drawings.
2. Modulus of Elasticity, Edgewise: as indicated on drawings.

B. Parallel-Strand Lumber: A composite of wood strand elements with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product has the following allowable design values as determined according to ASTM D 5456:

1. Extreme Fiber Stress in Bending, Edgewise: as indicated on drawings.
2. Modulus of Elasticity, Edgewise: as indicated on drawings.

C. Wood I-Joists: Prefabricated units complying with APA PRI-400; depths and performance ratings not less than those indicated.

1. Web Material: Either oriented strand board or plywood, Exposure 1
2. Structural Capacities: Establish and monitor structural capacities according to ASTM D 5055.
3. Trademark: Factory mark I-joists with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and I-joist compliance with APA standard.

D. Rim Boards: Performance-rated product complying with APA PRR-401.

1. Material: Structural composite lumber.
2. Thickness and Grade: as indicated on drawings.
3. Trademark: Factory mark with APA trademark indicating thickness, grade, and compliance with APA standard.

2.8 SHEATHING

A. Plywood Wall Sheathing: Exterior, Structural I sheathing.

1. Span Rating: Not less than 16/0.
2. Thickness: as indicated on drawings

B. Oriented-Strand-Board Wall Sheathing: Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 16/0.
2. Thickness: as indicated on drawings.

C. Plywood Roof Sheathing: Exterior, Structural I sheathing.

1. Span Rating: Not less than 24/0.
2. Thickness: as indicated on drawings.

D. Oriented-Strand-Board Roof Sheathing: Exposure 1, Structural I sheathing.

1. Span Rating: Not less than 24/0.
2. Thickness: as indicated on drawings.

2.9 SUBFLOORING AND UNDERLAYMENT

A. Underlayment: Provide underlayment in nominal thicknesses indicated, or if not indicated, not less than ¼ inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

2.10 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch (12.7 mm) thick.

2.11 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as

determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.12 METAL FRAMING ANCHORS

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:

1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

D. Joist Hangers: Hot dipped galvanized steel, sized per drawings.

E. Bridging: Rigid, V-section, nailless type, 0.062 inch (1.6 mm) thick, length to suit joist size and spacing.

F. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.

G. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches (57 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

H. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick by 36 inches (914 mm) long.

I. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.

1. Bolt Diameter, width, body thickness as indicated on drawings.

J. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches (29 mm) wide by 9/16 inch (14 mm) deep by 0.034 inch (0.85 mm) thick with hemmed edges.

K. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch (24 by 24 by 1 mm) thick with hemmed edges.

2.13 MISCELLANEOUS MATERIALS

A. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.

1. Thickness: Not less than 3 mils (0.08 mm).
2. Permeance: Not less than 10 perms (575 ng/Pa x s x sq. m).
3. Flame-Spread Index: 25 or less per ASTM E 84.
4. Allowable Exposure Time: Not less than three months.

C. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

D. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

E. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

F. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

G. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

H. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in the Uniform Building Code.
4. Table 2305.2, "Fastening Schedule," in the BOCA National Building Code.
5. Table 2306.1, "Fastening Schedule," in the Standard Building Code.
6. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in the International One- and Two-Family Dwelling Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 24 inches (610 mm) o.c.

C. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 600 mm o.c.

D. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

E. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 400 mm o.c.

F. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

G. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 400 mm o.c.

3.4 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Do not splice structural members between supports.

D. Where built-up beams or girders of 2-inch nominal- (38-mm actual-) dimension lumber on edge are required, fasten together with 2 rows of 20d (100-mm) nails spaced not less than 32 inches (812 mm) o.c. Locate one row near top edge and other near bottom edge.

1. For continuous members locate end joints over supports.

3.5 WALL AND PARTITION FRAMING INSTALLATION

A. General: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Anchor plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide 2-by-6-inch nominal- (38-by-140-mm actual-) size wood studs spaced 16 inches (406 mm) o.c., unless otherwise indicated.

2. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 16 inches (406 mm) o.c., unless otherwise indicated.

B. Construct corners and intersections with three or more studs. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches (2438 mm) high, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.

C. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- (38-mm actual-) thick lumber of same width as framing members.

D. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width, 6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000 mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.
2. For load-bearing walls, provide double-jamb studs for openings 72 inches (1800 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

E. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated. Provide one of the following:

F. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:

1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal- (19-by-89-mm actual-) size boards.
2. Diagonal bracing at 45-degree angle using metal bracing.
3. Plywood panels not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.
4. Oriented-strand-board panels not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.
5. Particleboard sheathing panels not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.
6. In lieu of bracing at corners or at locations indicated, continuous gypsum sheathing may be provided in panels not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.
7. In lieu of bracing at corners or at locations indicated, continuous fiberboard sheathing, intermediate type, may be provided in panels not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.

3.6 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists as follows:

1. Where supported on wood members, by using metal framing anchors.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches (76 mm) and do not embed more than 4 inches (102 mm).

C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).

D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.

E. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.

F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6.4-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c., extending over and fastening to 3 joists. Embed anchors at least 4 inches (102 mm) into grouted masonry with ends bent at right angles and extending 4 inches (102 mm) beyond bend.

H. Provide solid blocking between joists under jamb studs for openings.

I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

J. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal- (19-by-64-mm actual-) size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.
3. Bridging may be omitted where joist depth is 12-inch nominal (286-mm actual) size or less and where indicated live load is 40 lbf/sq. ft. (1915 Pa) or less.

3.7 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.8 TIMBER FRAMING INSTALLATION

A. Install timber with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports if not continuous.

B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) air space at sides and ends of wood members.

C. Install wood posts using metal anchors indicated.

D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.9 STAIR FRAMING INSTALLATION

A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

1. Stringer Size: 2-by-12-inch nominal- (38-by-286-mm actual-) size, minimum.

2. Notching: Notch stringers to receive treads, risers, and supports; leave at least 3-1/2 inches (89 mm) of effective depth.
3. Stringer Spacing: At least 3 stringers for each 36-inch (914-mm) clear width of stair.

B. Provide stair framing with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.

3.10 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

1. Comply with "Code Plus" provisions in above-referenced guide.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

a. Nail to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

2. Subflooring:

a. Nail to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

3. Sheathing:

a. Nail to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

4. Underlayment:

a. Nail to subflooring.
b. Space panels 1/32 inch (0.8 mm) apart at edges and ends.
c. Fill and sand edge joints of underlayment receiving resilient flooring just before installing flooring.

5. Plywood Backing Panels: Nail or screw to supports.

3.11 PARTICLEBOARD UNDERLAYMENT INSTALLATION

A. Comply with the National Particleboard Association's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.

1. Fastening Method: Nail underlayment to subflooring.

3.12 GYPSUM SHEATHING

A. General: Fasten gypsum sheathing to supports with galvanized roofing nails; comply with GA-253 and manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch (9.5 mm) from edges and ends of units.

B. Install 24-by-96-inch (609-by-2438-mm) sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints of adjacent boards not less than one stud spacing, two where possible.

C. Install 48-by-96-inch (1219-by-2438-mm) and longer sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Fit units tightly against each other.

3.13 FIBERBOARD SHEATHING INSTALLATION

A. Fasten fiberboard sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8 inch (9.5 mm) from edges and ends.

B. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch (3-mm) open space between edges and ends of adjacent units. Stagger horizontal joints, if any.

C. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

3.14 BUILDING PAPER APPLICATION

A. Apply building paper horizontally with 2-inch (50-mm) overlap and 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch (102-mm) overlap.

3.15 BUILDING WRAP APPLICATION

A. Cover wall sheathing with building wrap as indicated.

1. Comply with manufacturer's written instructions.
2. Cover upstanding flashing with 4-inch (102-mm) overlap.
3. Seal seams, edges, and penetrations with tape.
4. Extend into jambs of openings and seal corners with tape.

3.16 SHEATHING TAPE APPLICATION

A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06100

SECTION 06 15 33 – EXTERIOR WOOD DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.Section 06 52 00 ‘Plastic Structural Assemblies’ for deck joist pedestal support.

1.2 SUMMARY

A. Section Includes:
   1. Wood decking.
   2. Support framing for decks.

1.3 DEFINITIONS

A. Boards: Lumber of less than 2 inches nominal in thickness and 2 inches nominal or greater in width.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Timber: Lumber of 5 inches nominal or greater in least dimension.

D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NLMA: Northeastern Lumber Manufacturers' Association.
   2. NLGA: National Lumber Grades Authority.
   3. RIS: Redwood Inspection Service.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.
   7. FSC - Forest Stewardship Council Certification
   8. NFPA - Fire Safety Code
   9. UBC - 1979 Edition, Part VIII, Fire Resistive Standard for Fire Protection.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

Ipe Decking:

1. General Characteristics:
   a. Appearance: An extremely dense, tight grained wood. Generally, a deep rich brown with some pieces displaying red and amber hues.

b. Hardness: 3600 lbs
c. Bending Strength: 22,560 psi
d. Decay Resistance: Very durable and naturally resistant to decay and insects. Offers up to 75 plus year lifespan.
e. Weight: Basic specific gravity (oven dry weight/green volume) 0.85 to 0.97, air dry density 66 to 75 pounds per cubic foot.
f. Moisture Content of Decking:
   1. Ipe Decking is specially dried for use on exterior projects. DO NOT use kiln dried interior lumber in exterior projects as it will expand.
   2. Ipe lumber for indoor applications is kiln dried specifically for interior use. Ipe Decking dried for exterior use will shrink inside.
g. Janka side hardness: 3,060 lbs for green material and 3,680 lbs at 12 percent moisture content.

2. Slip Resistance: ASTM C 1028 tested; Exceeds the Americans with Disabilities Act requirements for Static Coefficient of friction in a wet environment.
3. Fire Rating Decking: Class A Flame Spread

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: For preservative-treated wood products and metal framing anchors.
   1. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

C. FSC Submittals: Provide documentation indicating manufacturer is FSC Chain-of-Custody certified.

D. Samples:
   1. For decking, not less than 24 inches long, showing the range of variation to be expected in appearance of decking, including surface texture.
   2. Pedestals: Submit sample of each pedestal component.

E. Shop Drawings: Submitted by contractor showing all components required for the deck & pedestal requirements. Shop drawings shall include plan drawings showing layout of all deck areas and detail drawings showing how the various components of the system fit together. Include manufacturer’s literature completely describing all components of the deck pedestal systems and giving detailed installation recommendations and instructions.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates:
   1. For lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.
   2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.

C. Evaluation Reports: For the following, from ICC-ES:
   1. Preservative-treated wood products.
   2. Expansion anchors.
   3. Metal framing anchors.
   4. Decking fasteners.

1.7 QUALITY ASSURANCE

A. Lumber Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Lumber Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by landscape architect.
   2. Do not proceed with remaining work until workmanship is approved by landscape architect.
   3. Refinish mock-up area as required to produce acceptable work.
   4. Accepted mock-up shall be comparison standard for remaining Work

1.8 Project Conditions

A. The substrate that is to receive pedestals must have slope and provide positive and adequate drainage in accordance with good building practice and applicable building codes

B. Installation or anticipated installation of additional items on top of the deck such as planters, hot tubs, sculptures, or industrial equipment must be supported directly by additional pedestals that are in addition to the main deck paver/tile pedestal system. Failure to adequately support the additional weight of any such features or items may cause significant damage to the deck, underlying structure, or waterproofing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Handle and store lumber to comply with vendors's written instructions.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.
   1. Factory mark each item with grade stamp of grading agency.
   2. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
   4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Certified Wood: Boards and dimension lumber shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

C. Maximum Moisture Content:
   1. Boards: 19 percent.
   2. Dimension Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness.
   3. Timber. 19 percent.

2.2 WOOD DECKING

A. Hand select wood for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

B. Dimension Lumber Decking: Construction or No. 2 grade and any of the following species:
   1. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
   2. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.

C. Board Decking: 6” x 5/4” actual thickness radius-edged S4S boards, with one face free of planer skip, machine burn, and torn or chipped grain.
   1. Species: Ipe.
   2. Grade Characteristics:
      a. Clear one face; small pin knots and worm holes allowed on back face.
      b. Sound; small pin knots, worm holes, and fixed knots allowed.
      c. All heart one face.
      d. Straight grained and parallel cut.
      e. Free of heart centers.
      f. No decay, incipient decay, honeycomb, knot holes, shakes, splits, or wane.

g. No discoloration.

2.3 DIMENSION LUMBER FRAMING

A. Deck Framing: Construction or No. 2 grade and any of the following species:
1. Hem-fir (North); NLGA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA.
4. Mixed southern pine; SPIB.
5. Spruce-pine-fir; NLGA.
6. Douglas fir-south; WWPA.
7. Hem-fir; WCLIB or WWPA.
8. Douglas fir-larch (North); NLGA.
9. Spruce-pine-fir (South); NeLMA, WCLIB, or WWPA.

B. Deck Framing: Any species and grade with a modulus of elasticity of at least 1,500,000 psi and an extreme fiber stress in bending of at least 1000 psi for 2-inch nominal thickness and 12-inch nominal width for single-member use.

2.4 PRESERVATIVE TREATMENT

A. Pressure treat boards and dimension lumber with waterborne preservative according to AWPA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

B. Pressure treat timber with waterborne preservative according to AWPA U1; Use Category UC4a.

C. Pressure treat poles with waterborne preservative according to AWPA U1; Use Category UC4a.

D. Preservative Chemicals: Acceptable to authorities having jurisdiction.
1. Do not use chemicals containing arsenic or chromium.

E. Use process for boards and dimension lumber that does not include water repellents or other substances that might interfere with application of indicated finishes.

F. After treatment, redry boards dimension lumber timber and poles to 19 percent maximum moisture content.

G. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed or omit marking and provide certificates of treatment compliance issued by inspection agency.

H. Application: Treat all wood unless otherwise indicated.
1. Framing members less than 18 inches above grade.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.
   1. Use fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or ASTM F 2329 unless otherwise indicated.
   2. For pressure-preservative-treated wood, use stainless-steel fasteners.
   3. For wood decking, use stainless-steel fasteners where fasteners are exposed to view.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: ICC-ES AC70.

D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.

E. Carbon-Steel Bolts: ASTM A 307ith ASTM A 563ex nuts and, where indicated, flat washers all hot-dip zinc coated.

F. Stainless-Steel Bolts: ASTM F 593, Alloy Group 1 or 2with ASTM F 594, Alloy Group 1 or 2ex nuts and, where indicated, flat washers.

G. Post installed Anchors: Stainless-steel, anchors with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.6 METAL FRAMING ANCHORS

A. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated on Drawings. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
   1. Strap Width: 1-1/2 inches or 2 inches
   2. Thickness: 0.050 inch.

C. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
   1. Width: 3/4 inch
   2. Thickness: 0.050 inch
   3. Length: 16 inches.

2.7 CONCEALED DECKING FASTENERS

A. Deck Splines: Corrosion-resistant metal or plastic splines that fit in grooves routed into the sides of decking material and are fastened to deck framing with screws. Splines provide uniform spacing of decking material.

B. Eb-Ty: An edge mount deck fastening system, with no surface screws visible.

2.8 PEDASTAL JOINT SUPPORT

A. Model Lo pedestal with Joint top joist connectors per plans, Available through Bison Innovative Products or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.

B. Install pedestals in accordance with Bison and other contributing manufacturer's instructions. Installation requirements vary for each individual project site. Decking, pattern, grid layout, starting point, and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.

C. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.

D. Install wood decking with crown up (bark side down).

E. Install lumber to comply with manufacturer's written instructions.

F. Secure decking to framing with deck splines deck clips deck tracks or screws.

G. Install metal framing anchors to comply with manufacturer's written instructions.

H. Do not splice structural members between supports unless otherwise indicated.

I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

K. Apply copper naphthenate field treatment to comply with AWPA M4, to cut surfaces of preservative-treated lumber.

L. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. ICC-ES AC70 for power-driven fasteners.
   2. "Fastening Schedule" in ICC's International Building Code.
   3. "Fastener Schedule for Structural Members" and "Alternate Attachments" in ICC's International Residential Code for One- and Two-Family Dwellings.

M. Use common wire nails unless otherwise indicated. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

N. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced and with adjacent rows staggered.

END OF SECTION

SECTION 06 18 00

STRUCTURAL GLUED-LAMINATED TIMBER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Beams, girders, and purlins.
2. Curved or arched structural members.
3. Columns.
4. Prefabricated trusses with chords of glued-laminated timber.

1.3 DEFINITIONS

A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives with the grain of the laminations approximately parallel longitudinally.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance of Structural Glulam Timber: Engineer, fabricate, and install structural glulam timber to withstand structural loads shown on Drawings without exceeding the allowable design working stresses according to AITC 117--DESIGN.

1.5 SUBMITTALS

A. Product Data: For glulam timber and accessories. Include installation instructions and data on lumber, adhesives, fabrication, treatment, and protection.

B. Shop Drawings: Show layout of structural glulam timber system and full dimensions of each member. Indicate species and laminating combination, adhesive type, and other variables in required Work.

1. Include large-scale details of connections.
2. For installed structural glulam timber indicated to comply with certain design loadings, include structural analysis data signed and sealed by the professional engineer responsible for their preparation.

C. Samples: Full width and depth, 36 inches long, showing the range of variation to be expected in appearance of structural glulam timber including treatment and finishing.

1. Apply specified factory finish to 3 sides of half-length of each sample.

D. Certificates of Conformance: Issued by inspection and testing agency indicating that glulam timbers comply with requirements of AITC A190.1.

E. Wood-Treatment Certificates: Signed by wood treater certifying that treatment processes comply with requirements.

1.6 QUALITY ASSURANCE

A. Quality Standard: Comply with AITC A190.1, "Structural Glued Laminated Timber."

1. Factory mark each piece of structural glulam timber with AITC Quality Mark. Place mark on surfaces that will not be exposed in completed Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with provisions of AITC 111, "Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage, and Erection."

B. Individually wrap members with plastic-coated paper covering, with water-resistant seams, before shipping or exposing to outdoor conditions.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLULAM TIMBER FRAMING

A. Species and Grades for Structural Glulam Timber: Provide glulam members that comply with "Performance Requirements" Article and are made from the following species:

1. Species: Southern pine.
2. Species: Douglas fir.
3. Species: Alaska cedar.
4. Species: Any species listed in AITC 117--MANUFACTURING.

B. Species and Grades for Beams, Purlins, and Arches: Provide glulam members of the following species that comply with AITC 117--MANUFACTURING for the following combination symbol:

1. Species and Combination Symbol: Southern pine, 24FV3.
2. Species and Combination Symbol: Southern pine, 24FV5.
3. Species and Combination Symbol: Douglas fir, 24FV4.
4. Species and Combination Symbol: Douglas fir, 24FV8.
5. Species and Combination Symbol: Alaska cedar, 20FV12.

C. Species and Grades for Columns and Truss Chords: Provide glulam members of the following species that comply with AITC 117--MANUFACTURING for the following combination symbol:

1. Species and Combination Symbol: Southern pine, 47.
2. Species and Combination Symbol: Southern pine, 50.
3. Species and Combination Symbol: Douglas fir, 1.
4. Species and Combination Symbol: Douglas fir, 3.
5. Species and Combination Symbol: Alaska cedar, 70.

D. Appearance Grade: Provide Premium appearance grade members complying with AITC 110.

1. Use clear wood inserts, of matching grain and color, for filling voids and knot holes over 1/4 inch (6 mm) wide.

E. Appearance Grade: Provide Architectural appearance grade members complying with AITC 110.

F. Appearance Grade: Provide Industrial appearance grade members complying with AITC 110.

G. Preservative Treatment: Where glulams are exposed to weather, members shall be treated after gluing in accordance with AWPA Standard U1 to the requirements of Use Category 3B (UC3B). After dressing and end-cutting each member to final size and shape, apply a field-treatment preservative to comply with AWPA M4 to surfaces cut to a depth of more than 1/16 inch (1.5 mm).

1. Use pentachlorophenol dissolved in light hydrocarbon solvents or other substances that will not interfere with application of indicated finishes.

H. Adhesive: Wet-use type complying with ASTM D 2559.

1. Do not use melamine-urea-formaldehyde adhesives for preservative-treated structural glulam timber.

I. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.

J. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

K. Connectors, Anchors, and Accessories: Fabricate from structural-steel shapes, plates, and bars complying with ASTM A 36 (ASTM A 36M); steel bars complying with ASTM A 575, Grade M 1020; and hot-rolled steel sheet complying with ASTM A 570 (ASTM A 570M), Grade 33.

1. Fabricate beam seats with 3/8-inch- (9.5-mm-) steel bearing plates, 3/4-inch- (19-mm-) diameter-by-12-inch- (300-mm-) long deformed bar anchors, and 0.239-inch (6-mm) side plates.
2. Fabricate arch base shoes with 1-inch- (25-mm-) steel base plates and 3/8-inch- (9.5-mm-) steel side plates.

3. Fabricate purlin hangers with 0.179-inch (4.6-mm) stirrups and 0.239-inch (6-mm) top plates.
4. Fabricate hinge connectors with 0.179-inch (4.6-mm) side plates and 1-inch (25-mm) top and bottom plates.
5. Fabricate strap ties from 3-inch- (75-mm-) wide, 0.239-inch (6-mm) steel sheet.
6. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A 668 (ASTM A 668M).
7. Provide bolts, 3/4 inch (19 mm), unless otherwise indicated, complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); nuts complying with ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
8. Provide shear plates, 4 inches (102 mm) in diameter, cast from malleable iron complying with ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).
9. Finish each assembly and fastener with rust-inhibitive primer, 2-mil (0.05-mm) dry film thickness.
10. Hot-dip galvanize each assembly and fastener after fabrication to comply with ASTM A 123 or ASTM A 153 (ASTM A 153M).

2.2 FABRICATION

A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.

B. Camber: Fabricate horizontal and inclined members, units of less than 1:1 slope, with either circular or parabolic camber equal to 1/500 of span.

C. End-Cut Sealing: Immediately after end-cutting each member to final length and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.

D. Seal Coat: After fabricating and sanding each unit, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where treatment included a water repellent.

2.3 FACTORY FINISHING

A. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer, oven dried and resistant to mildew and fungus.

1. Provide color selected by Architect from manufacturer's full range of colors.
2. Provide color matching Architect's sample.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Erect structural glulam timber framing true and plumb, with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

1. Use padded slings and protect corners with wood blocking.

B. Fit structural glulam timber framing by cutting and restoring exposed surfaces to match specified surfacing. Predrill for fasteners and assembly of units.

1. Use connectors as templates for drilling bolt holes.
2. Machine sand exposed surfaces to remove planing or surfacing marks, finishing with No. 120 grit sandpaper.
3. Coat crosscuts with end sealer.
4. Where treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.

C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

1. Where treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.

D. Install steel connectors, anchors, and accessories as indicated.

3.2 ADJUSTING AND CLEANING

A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glulam timber if repairs are not approved by Architect.

3.3 PROTECTION

A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, soiling, and damage from work of other trades.

1. Coordinate wrapping removal with finishing work specified in Division 9. Retain wrapping where it can serve as a painting shield.

END OF SECTION 06185

SECTION 06 40 13

ARCHITECTURAL WOODWORK AND CLADDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior Horizontal Wall Cladding.
2. Exterior Horizontal Wall Siding
3. Interior Horizontal Wall Cladding.
4. Exterior Trellis Lumber

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Flame Spread Rating for exterior materials: Meeting ASTM E84 Class A.
2. Wildlife Urban Interface (WUI): Provide data showing compliance with California WUI (CBC Chapter 7A) requirements.
3. Durability Rating for exterior materials: Meeting EN 350 Durability Class 1.

B. Shop Drawings: For exterior architectural woodwork.

1. Include accurately scaled, CAD drawn plans, elevations, sections, edge details, and attachment details showing entire assembly.
a. Details shall be drawn at 3” = 1’-0” scale minimum.

C. Samples: For each exposed product and for each color and finish specified.

D. Mock-ups: Provide a 4 foot tall x 8 foot long mock-up of the following for review and approval by Architect prior to final approval of shop drawings:
1. Interior Horizontal Wall Cladding
2. Junction of Exterior Horizontal Wall Cladding on steel framing and Horizontal Wall Siding.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation of exterior architectural woodwork only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

B. Confirm field conditions comply with manufacturers recommendations prior to commencing work.

PART 2 PRODUCTS

1.5 EXTERIOR ARCHITECTURAL WOODWORK, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of exterior architectural woodwork indicated for construction, finishes, installation, and other requirements.

B. Comply with manufacturers standards and recommendations.

1.6 EXTERIOR HORIZONTAL WALL CLADDING AND SIDING MATERIALS

A. Products: Basis of Design, provide materials that comply with the following:

1. Material: Moso, Bamboo X-treme, as supplied by Moso North America, 203 NE Front Street, Suite 101, Milford DE 19963, 855-343-8444.

2. Or approved Equal

3. Size: 3/4” thick x 5 ¾” wide. Supplied in 6 foot lengths.

4. Profile:
   a. S4S rectangular shape for trellis cladding.
   b. T&G shape for building wall siding.

5. Pattern: Install cladding as indicated on drawings, and as approved through mock-up process.

6. Color: Natural (no finish).

7. Attachment: As indicated on drawings..

1.7 INTERIOR HORIZONTAL WALL CLADDING MATERIALS

A. Products: Basis of Design, provide materials that comply with the following:

1. Material: Maple Veneer Plywood

2. Size: Square Edge siding profile 1/2” thick x 6” wide. Supplied in 8, 10 or 12 foot lengths as dictated by plywood sheet size.

3. Profile: Square Edge Board (S4S), with 4-sides primarily clear.

4. Pattern: Install cladding as indicated on drawings, and as approved through mock-up process.

5. Color: Stain and Sealer per specification 09 90 00 Painting.

1.8 MISCELLANEOUS MATERIALS

A. Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Nails: 316 Stainless steel, as recommended by wood manufacturer.

C. Screws: 316 Stainless steel trim-head type, as recommended by wood manufacturer.

1. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

E. Drainage Mat: Install wood siding over 7mm thick Drainage Mat (Vapro Sheild, Vapro-Mat, or approved equal).

PART 3 EXECUTION

1.9 INSTALLATION

A. Before installation, condition exterior architectural woodwork to average prevailing humidity conditions at Project site.

B. Install architectural woodwork level, plumb, true in line, and without distortion. Shim as required with concealed shims, and as approved by manufacturer. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut architectural woodwork to fit adjoining work with uniform joints as indicated, refinish cut surfaces to match desired face finish, and repair damaged finish at cuts, scratches, or other visibly noticeable marks.

D. Anchor architectural woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as identified for each material.

E. Contractor to replace any wood and backing elements that fail to perform as designed, that fail to align or fit neatly, or wood that is damaged during installation or construction.

END OF SECTION 06 40 13

SECTION 06 41 16
PLASTIC LAMINATE FACED CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Plastic-laminate cabinets.
   2. Solid-surfacing-material countertops.

B. Related Sections include the following:
   1. Division 22 section “Plumbing” for coordination with plumbing fixture installation.
   2. Division 26 section “Electrical” for coordination with plumbing fixture installation.

1.2 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing casework items, unless concealed within other construction before casework installation.

1.3 SUBMITTALS

A. Product Data: For hardboard, medium-density fiberboard, particleboard, plywood, high-pressure decorative laminate, adhesive for bonding plastic laminate, solid-surfacing material, cabinet hardware and accessories, handrail brackets, and finishing materials and processes.

B. Shop Drawings: Provide accurately scaled, CAD drawn Shop Drawing that show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

   1. Show details full size.
   2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
   4. Show laminates with identification numbers indicating the colors selected.

C. Samples for Verification: Colors, textures, and patterns as indicated in drawings.
   1. Plastic laminates.
   2. Solid-surfacing materials.

1.4 QUALITY ASSURANCE

A. Quality Standard: Unless otherwise indicated, comply with WIC's "Manual of Millwork" for grades of interior architectural woodwork, construction, finishes, and other requirements.
   1. Grade of Woodwork: WIC casework, Premium Grade, flush overlay construction, per Section 15, except as otherwise modified herein.
   2. Provide WIC-certified compliance certificate indicating that woodwork complies with requirements of grades specified.
   3. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the WIC quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Exterior Grade Plywood, unless noted otherwise.

C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Manufacturer: Products by Wilsonart, Formica, Abet Laminati, or Equal.

2. Color and Pattern: As indicated in drawings.

D. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement meeting low VOC content requirements.

E. Solid-Surfacing Manufacturer: Products by Wilsonart, Caesar Stone, Silestone, Dupont, or Equal.
   a. Color and Pattern: Matching Architects selection as determined by Architect

F. CABINET HARDWARE AND ACCESSORIES
1. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
2. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

F. Frameless Concealed Hinges (European Type): Blum “BLUMOTION” “CLIP top”, 120 degrees of opening, soft closing.

G. Pulls: Tab shaped accessible pulls conforming to CBC Section 1125B.4, edge mounted, 6 inches long, .49 inch thick 304 stainless steel, satin finish- Basis of Design: Reveal Design- “Washington Pull”

H. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081 where indicated and BHMA A156.9, B04102; with shelf brackets, B04112 where indicated.

I. Shelf Rests: BHMA A156.9, B04013.

J. Drawer Slides (premium grade cabinets with wood drawer boxes): Bottom-mounted, full-extension, Blum “TANDEM plus BLUMOTION”, soft closing, and rated for the following loads:

1. Box Drawer Slides: 100 lbf.

K. Drawer System (custom grade cabinets): Blum “TANDEMBOX plus BLUMOTION” Bottom-mounted slides, full-extension, , soft closing, and rated for the following loads:

1. Box Drawer Slides: 100 lbf.

L. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

M. Door Locks: BHMA A156.11, E07121.

N. Drawer Locks: BHMA A156.11, E07041.

O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

P. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.2 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.3 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide Premium and Custom grade interior woodwork complying with the referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

2.4 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with WIC Section 15.

B. Grade: Premium.

C. AWI Type of Cabinet Construction: Flush overlay.

D. WIC Construction Style: Style A, Frameless.

E. WIC Construction Type: Type I, multiple self-supporting units rigidly joined together.

F. WIC Door and Drawer Front Style: Flush overlay.

G. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: HGS.
2. Vertical Surfaces: VGS.
3. Edges: VGS.

H. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
2. Drawer Sides, Backs and bottoms: Blum “TANDEMBOX” Drawer System

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Provide Materials matching those indicated in Drawings.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Quality Standard: Comply with WIC Section 17D.

B. Grade: Custom.

C. Solid-Surfacing-Material Thickness: as noted in 2.1 Materials.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
1. Provide Materials matching those indicated in Drawings.

E. Where possible, fabricate tops and side panels in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

B. Before installing architectural casework, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with WIC Section 26 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install casework level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut casework to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.

D. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective casework, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean casework on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 41 16

SECTION 065200 – PLASTIC STRUCTURAL ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES
Level.It Adjustable Pedestals
Fixed Height Pedestals
Bison Joist Top

1.2 RELATED SECTIONS
Section 06 15 33 – Exterior Wood Decking

1.3 REFERENCES
ASTM D 1238-04 – Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D 792-00 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D 638-03 – Standard Test Method for Tensile Properties of Plastics
ASTM D 2843 – Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics
ASTM D 635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position
ASTM D543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents (NaOH and HCl)
ASTM D 256-06 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D 648-06 – Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

1.4 SUBMITTALS
A. Submit under provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Submit shop drawings detailing the installation methods. Coordinate placement with locations noted on the Contract Drawings.

1.5 QUALITY ASSURANCE
A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by landscape Architect.
   2. Do not proceed with remaining work until workmanship is approved by landscape architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Inspect all delivered materials to insure they are undamaged and in good condition.
B. Deliver and store Bison pedestals and system components with labels intact and legible.

C. Store products in an enclosed or covered area protected from the elements as site conditions allow.
D. Store and dispose of solvent-based materials such as construction adhesive, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. There are no pedestal installation temperature restriction guidelines other than the practical considerations of working in any unsafe condition or inclement weather.
B. Pedestals specified are for pedestrian traffic only.
C. Perimeter Walls and Containment:
   1. Decks must be restrained by perimeter blocking or walls on all sides including "on-grade" installations. Lateral movement greater than one-tab set (not to exceed 3/16 inch or 4.5 mm) is unacceptable and will be subject to rejection.

D. Heavy Roof Top and Flat Bottom Features require individual support in addition to the deck pedestal system.
   1. A minimum of one additional pedestal support must be installed for every 500 lbs. (or portion thereof) of static loading. These additional support pedestals must be installed directly under the decking and evenly spaced immediately below the feature locations. *One additional pedestal must be placed under each corner of any rectangular feature.*
   2. Any feature that creates vibration must be provided for in special consultation and written agreement with Bison. Cell phone towers, heavy planters and other similar features require their own separate curb designed by an architect or professional engineer.
E. All decks shall be designed to not exceed the design capacity of the pedestal.
F. The substrate immediately below the pedestals shall provide positive drainage.
G. Pedestals must be supported by a surface that provides 40 psi bearing capacity. Membranes installed over rigid insulation board typically incorporate 20 psi density insulation which requires additional support for adequate load bearing of 40 psi.

1.8 WARRANTY

A. At project closeout and upon request, Bison pedestals can provide to the Owner or Owners Representative, an executed copy of the manufacturer's standard document outlining the terms, conditions and limitations of their limited warranty against manufacturing defect for a period of five (5) years.
B. The Contractor warrants that his work will remain free from defects of labor and materials used in conjunction with his work in accordance with the General Conditions for this project or a minimum of five (5) years.
C. It is the responsibility of the Contractor installing the product listed in this section to coordinate warranty requirements with any related sections or adjacent work. Notify the Architect immediately of any potential lapses or limitations in warranty coverage.
D. For use with pedestrian traffic only. Never use Bison pedestals to support or construct decks that have wheeled, motorized or equipment traffic.
E. Decks should be restrained on all sides and not have lateral movement in excess of one tab set (not to exceed 3/16 inch or 4.5 mm).
F. Deck must be installed according to specifications or warranty is voided.

1.9 MANUFACTURERS

A. Acceptable Pedestal System Manufacturer: Bison Innovative Products; 701 Osage Street, Unit 120, Denver, CO 80204
Toll Free: 800-333-4234 Phone: 303-892-0400 Fax: 303-825-5988 Email: info@bisonip.com Web: www.bisonip.com.
B. Requests for substitutions will be considered in accordance with provisions of Section 012500.

PART 2 PRODUCTS

2.1 LEVEL.IT ADJUSTABLE DECK PEDESTALS
Height Range 2 to 12 inches; Weight Bearing Capacity 750lbs/pedestal (FS:3); Select 3/16 inch or 1/8 inch (3.175mm) tabs; Made in the U.S.A.

A. LC Base Model:
1. General Pedestal Details:
a. 2 to 4 ¾ inches (50.8 to 120.6mm)
b. Capacity: 750 lbs. (340 kg) per pedestal with a Safety Factor of 3 (FS:3)
c. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
d. Contains 20% post-industrial recycled material
2. Pedestal Base Details:
a. Size: 7 7/8 inch (200mm) diameter by 3/16 inch (4.7mm) top wall thickness
b. Bearing Surface Area: 48 in^2 (310 cm^2)
c. Four (4) ¾ inch (19mm) diameter holes for drainage
d. Four (4) ¼ inch (6mm) diameter holes for mechanical attachment
e. Compatible with LD4 slope compensator (sold separately)
3. Pedestal Top Details:
a. 5 7/8 inch (150mm) diameter by 5/16 inch (8mm) thick plate
b. Bearing Surface Area: 27 in^2 (174 cm^2)
c. Eight (8) 3/8 inch (9.5mm) diameter holes for drainage and/or mechanical attachment
d. Integrated C3 Coupler (not sold separately)

B. Model LO: 1 ¼ to 2 inches (32 to 51mm), select 3/16 inch or 1/8 inch spacer tabs.
1. General Pedestal Details:
a. Height Range: 1 ¼ to 2 inches (32 to 51mm)
b. Capacity: 750 lbs. (340 kg) per pedestal with a Safety Factor of 3 (FS:3)
c. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
d. Contains 20% post-industrial materials
2. Pedestal Base Details:
a. Size: 7 7/8 inch (200mm) diameter x 3/16 inch (4.75mm) top wall thickness.
b. Bearing Surface Area: 48.7 in^2 (314 cm^2).
c. Four (4) ¾ inch (19mm) diameter holes for drainage
d. Eight (8) ½ inch (13mm) diameter holes for BB-PEGS
e. Compatible with LD4 slope compensation (sold separately)
3. Pedestal Top Details:
a. Diameter: 6 inches (152 mm) by 5/32 inch (4 mm) thick plate
b. Bearing Surface Area: 28.3 in^2 (183 cm^2)
c. Eight (8) 3/8 inch (9.5mm) diameter holes for drainage and/or mechanical attachment

C. Model C1 Coupler: Adds up to 1 1/2 inches (44mm) of pedestal height to Model LC.
1. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.

2. Contains 20% post-industrial recycled material.

D. Model: LT18 Spacer Tabs - 1/8 inch (3.175mm) thick. Spacer tab option for Model LC and LO.
   1. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   2. Contains 20% post-industrial recycled material.

E. Model: LT316 Spacer Tabs -3/16 inch (4.5mm) thick. Spacer tab option for Model LC and LO.
   1. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   2. Contains 20% post-industrial recycled material.

F. Additional Product Configurations for Level.it Pedestal:
   1. Model: LC + C1 = 4 ¾ to 6 ½ inches (121 to 165 mm)
   2. Model: LC + C4 = 6 ½ to 9 inches (165 to 229 mm)

2.2 LOW HEIGHT PEDESTAL SUPPORTS

A. Model VT316 or VT18 Fixed Height Pedestals:
   1. Diameter: 4 ¾ inches (121 mm) diameter x 1/8 inch (3.175mm) tall.
   2. Bearing Surface 17.7 in^2 (114 cm^2).
   3. Integral Spacer Tabs: Specify 1/8 inch or 3/16 inch.
   4. Does not accommodate slope compensation.
   5. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   6. Contains 20% post-industrial recycled material.

B. Model HD Fixed Height Pedestals:
   1. Diameter: 6 inches (152 mm) diameter x 3/32 inch wall thickness.
   2. Bearing Surface Area: 27.7 in^2 (179 cm^2).
   3. Does not include slope compensation. Can accommodate Model LD4 for ¼ inch per foot slope compensation.
   4. Material: Model HD25 Thermoplastic Elastomer*;* HD50 and HD75 Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.

C. Model HD25-18: Stackable (4 Max) ¼ inch (6.4mm) tall, with integral 1/8 inch integral Spacer Tabs

D. Model HD25-316: Stackable (4 Max) ¼ inch (6.4mm) tall, with integral 3/16 inch integral Spacer Tabs

E. Model HD50-18: Stackable (4 Max) ½ inch (13mm) tall, with 1/8 inch integral Spacer Tabs

F. Model HD50-316: Stackable (4 Max) ½ inch (13mm) tall, with 3/16 inch integral Spacer Tabs

G. Model HD75-18: Stackable (4 Max) ¾ inch (19mm) tall, with 1/8 inch integral Spacer Tabs

H. Model HD75-316: Stackable (4 Max) ¾ inch (19mm) tall, with 3/16 inch integral Spacer Tabs

2.3 BASE LEVELER DISKS

A. Model LD4: Placed beneath pedestals*,* Model LD4 adds approximately 5/16 to ½ inch to pedestal height, increases base bearing surface area to 50.3 in^2 (325 cm^2), and allows for ¼ to 1 inch per foot slope compensation.
   1. Slope: 1/4 inch per foot each. A total of 4 LD4s may be used under Models LC, LO, HD25, HD50, HD75; LD4s are *not recommended* for use under VT Fixed Height Pedestals.
   2. Stack up to four LD4s under one pedestal for up to 1 inch of slope compensation.
   3. Diameter: 8 inches (203 mm); Center point thickness 3/8 inch (9.5mm).
   4. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   5. Contains 20% post-industrial recycled material.

2.4 JOIST TOP

A. Model JT: Pedestal Accessory to construct joist and plank decks. Accommodates 2 x and 4 x joists.
   1. Adds 3/16 inch (4.5mm) in height. Creates a base bearing surface for joist installation.
   2. Material: Polypropylene. Bison #B-PP-2025.

2.5 SHIMS

A. Model B11: Flexible Shim 1/16 inch (1.5mm)
   1. Use no more than 4 shims per pedestal. If using a segment, adhere it to the pedestal with construction adhesive. Ensure the adhesive does not contact the roofing membrane.
   2. Material: Thermoplastic Elastomer.

B. Model PS1: Rigid Poly Shims 1/8 inch (3.175mm)
   1. Use no more than 2 shims. If using a segment, adhere it to the pedestal with construction adhesive. Ensure the adhesive does not contact the roofing membrane.
   2. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   3. Contains 20% post-industrial recycled material.

C. Model: BB-Wedge
   1. Spacing Wedge.
   2. Material: Mineral Filled High Density Copolymer Polypropylene. Bison #B-PP-2025.
   3. Contains 20% post-industrial recycled material.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify all elevations, required pedestal heights, insulation density, and deck dimensions before commencing work.

B. Do not begin installation until substrates have been properly prepared.
   1. The substrate surface that will receive the deck supports must be well compacted (on-grade) and structurally capable of carrying the dead and live loads anticipated.
   2. The substrate must be clean and free of projections and debris that could impair the performance of the pedestals or the total deck system.

C. If substrate preparation is the responsibility of another installer, notify Architect (or other appropriate party: Engineer, General Contractor, or Project Manager) of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Reference Installation Details documentation for recommended preparations.

B. Establish accurate lines, levels and pattern as per installation instructions.

C. Installation requirements vary for each individual project site. Deck materials used, pattern, grid layout, starting point, and finished elevation should be shown on plan view shop drawings which have been prepared and approved by the designer, installing contractor and/or owner.

3.3 INSTALLATION

A. Reference manufacturer Installation Details documentation for recommended installation procedures (details can be found online on the Bison website).

B. If you encounter a situation during installation which is not covered in the installation details, please contact Bison at 303-892-0400 or Toll-Free at 800-333-4234.

3.4 PEDESTAL ADJUSTMENT

A. Ensure pedestals have been shimmed/adjusted for rocking, uneven, or un-level pavers prior to substantial completion.
B. Reference manufacturer Installation Details documentation for adjustment procedures such as shimming a pedestal or adjusting the slope compensation on the pedestal.

3.5 FIELD QUALITY CONTROL

A. During Installation:
   1. Inspect construction progress regularly to ensure grid line spacing is being maintained in a straight and consistent manner and deck panels or pavers are level and not rocking, shim as required. Particular attention should be paid to pedestrian entrance or access points to eliminate potential trip hazards.
   2. Confirm that deck pedestal height does not exceed specified height (12 inches).
   3. Unless otherwise specified in writing to allow for expansion, inspect to ensure that all paver spacing between tiles and at the perimeter is no greater than one tab set (not to exceed 3/16 inch or 4.5 mm). Install/Adhere partial tab sets as required to maintain proper gapping.
B. Immediately Following Installation: The Owner, or the Owner's Agent, shall carefully inspect the deck system to verify:
   1. The new deck is blocked on all sides to contain the surface decking and related components.
   2. There is no more than one tab set (not to exceed 3/16 inch or 4.5 mm) gapping between any deck panels and at all sides of the deck perimeter.
   3. There is no ballasting rock used to fill in any perimeter voids.
   4. Deck panels do not rock when you walk across the decking surface.
   5. All spacer tabs are in place, visible and secure.
C. Other: Installer and/or Architect has the responsibility of informing the Owner about performing routine maintenance on the deck, this includes:
   1. Checking for rocking pavers or surface tiles and properly applying shims as the substrate can settle and require pedestal adjustment.
   2. Periodically checking for broken, damaged, or missing tab sets and replacing them to limit deck movement.
   3. Maintaining intact and structurally sound perimeter containment.
   4. Replacing damaged surface tiles, pavers, or pedestals.

END OF SECTION

SECTION 07 13 26
SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Modified bituminous sheet waterproofing, fabric reinforced.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
   2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions. Shop Drawings must be coordinated with Sheet Metal Flashing and Trim Shop Drawings for location of Sheet Waterproofing and interface with metal and concrete substrates. Shop drawings must be coordinated with other waterproofing systems as required to create a complete system for review

1.1 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.
B. Sample Warranties: For special warranties.

1.2 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation. Mockups shall be done concurrently with Sheet Metal Flashing Mock-ups per requirements of Section 07 62 00.
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless University’s Representative specifically approves such deviations in writing.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.3 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
   1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.4 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
   1. Warranty Period: Ten years from date of Substantial Completion.
B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
C. The Contractor will repair or replace any or all work (together with any other work which may be marred or damaged in so doing), that may prove defective or fail to conform to contract requirements, workmanship, and materials, all without any expense to the City for a period of five (5) years.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials**,** from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet, Fabric Reinforced: Minimum 60-mil nominal thickness, self-adhering sheet consisting of rubberized-asphalt membrane with embedded fabric reinforcement, and with release liner on adhesive side.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Protecto Wrap Company; Jiffy Seal 140/60
      b. Royston; 104AHT Membrane.
      c. Carlisle Coatings, CCW MiraDRI 860/861
      d. Or approved equal.
   2. Physical Properties:
      a. Pliability: No cracks when bent 180 degrees over a 1-inch mandrel at minus 25 deg F ; ASTM D 146.
      b. Puncture Resistance: 60 lbf minimum; ASTM E 154.
      c. Water Vapor Permeance: 0.05 perms maximum; ASTM E 96/E 96M, Water Method.
   3. Sheet Strips: Self-adhering, reinforced, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
   1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.
C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the waterproofing.
1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
F. Bridge and cover isolation joints discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.
b. At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.
H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F , install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F .
D. Two-Ply Application: Install sheets to form a membrane with lap widths not less than 50 percent of sheet widths, to provide a minimum of two thicknesses of sheet membrane over areas to receive waterproofing.
E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.
F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
G. Seal edges of sheet-waterproofing terminations with mastic.
H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

3.4 FIELD QUALITY CONTROL

A. Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish daily reports to University’s Representative.
B. Prepare test and inspection reports.

3.5 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.
B. Protect waterproofing from damage and wear during remainder of construction period.
C. Protect installed membrane from damage due to UV light, harmful weather exposures, physical abuse, and other causes.
D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 07 14 16
COLD FLUID-APPLIED WATERPROOFING

Part 1 - GENERAL

1.01 Summary

A. Section includes:
Provide a complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at locations indicated.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 Submittals

A. Comply with pertinent provisions of Section 01 33 00.

B. Product data:
1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades;
4. Manufacturer's current recommended installation procedures which, when reviewed by Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.03 Quality Assurance

A. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.

C. Convene a pre-installation job-site conference three weeks prior to commencing work of this Section:
1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.

1.04 Delivery, Storage and Handling

A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.

B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

C. Comply with pertinent provisions of Section 01 66 00.

1.05 Substrate Conditions

A. General:
1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
2. Using suitable abrasive methods, remove residue of form release, curing compound,

chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.

B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom.
C. Plywood: Where work of this Section will be applied to plywood, provide exterior grade plywood, 5/8" thick minimum, with A-side up, fastened with ring-shank nails.
D. Decks:
   1. Slope deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
   2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.
E. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.
F. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.06 Warranty

A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship executed for the following periods following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure resulting from substrate cracking up to 1/16 inch.
   1. Manufacturer's standard warranty covering materials for 10 year period (when applied at 120 mils);
   2. Applicator's standard warranty covering workmanship for two year period.

Part 2 - PRODUCTS

2.01 General

A. Provide a complete fluid applied elastomeric waterproofing membrane system designed for concealed building components subject to hydrostatic head that is polyurethane, coal-tar free and complies with ASTM C 836:
   1. Basis of Design:
      a. TREMproof 250GC; Tremco Inc.
      b. Or approved equal

2.02 Accessories

A. Primer: As recommended by waterproofing membrane system manufacturer;
B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;
C. Reinforcing fabric: Woven fiberglass scrim cloth;
D. Elastomeric sheet flashing: 1/16 inch thick by 12 inch wide uncured neoprene sheeting;
E. Elastomeric transition flashing to above-grade: polyurethane liquid-applied coating system with ultraviolet protective topcoat.
   1. Acceptable product:
      a. Vulkem 350NF/351NF; Tremco Inc.
F. Joint Treatment:
   1. Acceptable product:
      a. Dymeric 240FC; Tremco Inc.
      b. Dymonic 100, Tremco Inc.

c. TREMproof 250GCT; Tremco Inc.
d. or prior approved equal

G. Protection course: As recommended by waterproofing membrane manufacturer.
1. Acceptable product for walls (where no drainage outlet is available):
a. Protection Mat; Tremco Inc.

H. Prefabricated Composite Drainage: Two-part prefabricated composite drainage material consisting of a formed polystyrene core covered on one side with filter fabric.
1. For slabs receiving concrete topping, for backfilled walls, and for planters, a composite drainage mat with woven monofilament filter fabric, 16 gpm/ft flow capacity per unit width and 21,000 lbs/ft² compressive strength. Acceptable products:
a. Tremdrain 1000; Tremco Inc.

2.03 Other Materials

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

Part 3 - EXECUTION

3.01 Surface Conditions

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
1. Verify conformance with manufacturer's requirements;
2. Report unsatisfactory conditions in writing to the General Contractor.
3. Do not proceed until unsatisfactory conditions are corrected.

3.02 Preparation

A. Surface preparation and detailing procedures to be in accord with waterproof membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.
B. Clean all deck surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membranes immediately prior to installation.
C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.
D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.
E. Prime surfaces in accord with manufacturer's instructions.
F. Install detail coats, joint and crack treatments, elastomeric flashing and reinforcing fabric in accord with manufacturer's instructions.
G. Allow detail applications to cure in accordance with manufacturer's instructions prior to general application of membrane.

3.03 Application

A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
1. Begin with a 30 mil detail coat, and proceed with additional coats, gridding deck and wall

surfaces to assure proper coverage rates and verify membrane wet-film mil thickness with gauges as work progresses to achieve the required mil thickness.

2. Retain empty product containers during course of work to aid in determining whether completed membrane complies with required average dry-film thickness.

B. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.

C. Mask off adjoining surfaces not to receive membrane system.

D. Wipe clean all detail coats with white rags wetted with Acetone solvent; do not saturate detail coat.

E. Apply membrane uniformly and allow to cure in accordance with manufacturer's instructions.

F. Feather terminating edge when entire area cannot be completed in one day; clean area 6" wide along terminating edge of membrane with Acetone solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.

G. Flood test: Follow ASTM D 5957. Plug drains on deck surfaces and use sand bags or other means to restrict runoff. Flood deck with water to depth of 2" (50 mm) and allow to stand at least 48 hours.

H. Install protection course over cured membrane in accord with manufacturer's instructions.

I. Install drainage material in accord with manufacturer's instructions.

3.04 Protection and Clean-Up

A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Acetone; leave work area in broom clean condition.

B. Prohibit traffic over completed work and protect against work overhead until protection course is installed; protect from damage until protected beneath overlaying work.

END OF SECTION 07 14 16

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Polyisocyanurate foam-plastic board.
   2. Glass-fiber blanket.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research reports.

PART 2 - PRODUCTS

2.1 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyiosanurate rigid insulation board for use in enclosed assemblies for roofing and wall construction.

B. Polyisocyanurate Board, Foil Faced ASTM C 1289, foil faced, Type I, Class 1 or 2.

   1. Basis of Design: Rmax Operating, LLC, which is located at: 13524 Welch Rd.; Dallas, TX 75244-5227; Toll Free Tel: 800-527-0890; Tel: 972-387-4500; Fax: 972-387-4673; Email: request info (rmax@rmax.com); Web:www.rmax.com
   2. Continuous Insulation for Exterior Walls: Rmax TSX-8500, Exposed use, closed-cell polyisocyanurate insulation with a 12 mil glass fiber reinforced foil facer on one side and a 10mil glass fiber reinforced foil facer on the other side.
   3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 GLASS-FIBER BLANKET

A. Unfaced Glass Fiber Batt Insulation for use in framed wall, floor, ceiling and roof construction where product will not be visible.

B. Faced Glass Fiber Batt Insulation for use in open framed walls and ceiling finishes where and insulation and wall/roof construction will be visible. Identified on the drawings with O.T.S. (open to structure above) and O.T.S.P. (open to structural above-paint) and at all locations of birch plywood plank wall and ceiling cladding.

C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

D. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 30 percent.

E. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

F. Kraft Faced, Glass-Fiber Blanket Insulation; ASTM C662, Type II, Class C, Category 3.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

END OF SECTION 07 21 00

SECTION 07 25 00

WEATHER BARRIERS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work and coordinate overlapping Work.

B. Consult Vaproshield.com for updates to this document and current installation instructions. Always use the latest version available.

1.02 SYSTEM DESCRIPTION

A. Supply labor, materials and equipment for a fully adhered water-resistive vapor permeable air barrier membrane system.

B. Complete Work as shown on the Drawings and specified herein to bridge gaps and seal the water-resistive vapor permeable air barrier membrane against air leakage and water intrusion.

1. Connections of the walls to the roof membrane
2. Connections of the walls to the foundations
3. Seismic and expansion joints
4. Openings and penetrations of window and door frames, store front, curtain wall
5. Piping, conduit, duct and similar penetrations
6. Masonry ties, screws, bolts and similar penetrations
7. All other air leakage pathways in the building envelope

C. Install primary water-resistive vapor permeable air barrier, flashing, lap seam tapes, sill pan and ventilation strip accessories.

1.03 RELATED SECTIONS

A. Section 064013 “Architectural Woodwork and Cladding”

B. Section 074113 “Corrugated Metal Roof Panels”

C. Section 074114 “Standing Seam Metal Roof Panels”

D. Section 092400 “Cement Plastering”

1.04 REFERENCE STANDARDS

A. American Association of Textile Chemists and Colorists (AATCC): ATCC 127 - Test Method for Water Resistance: Hydrostatic Pressure Test.

B. ASTM International (ASTM):

1. ASTM D 882 - Test Method for Tensile Properties of Thin Plastic Sheeting.
2. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E 96/E 96M - Test Methods for Water Vapor Transmission of Materials.
4. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
5. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.
6. ASTM E2357 - Standard Test Method for determining Air Leakage of Air Barrier Assemblies.

C. International Code Council Evaluation Service, Inc. (ICC-ES): ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers.

1.05 SUBMITTALS

A. Submit manufacturers' current product data sheets, details and installation instructions for the water-resistive vapor permeable air barrier membrane components and accessories.

B. Submit samples of the following:

1. Manufacturer's sample warranty
2. Water-resistive vapor permeable air barrier sheet, minimum 8 by 10 inches (203 by 254 mm)
3. Components, minimum 12-inch (305-mm) lengths
4. Membrane flashings
5. Fasteners, clips, strapping and masonry ties
6. Sealants

1.06 QUALITY ASSURANCE

A. Single Source: Self-adhered water-resistive vapor permeable air barrier membrane components and accessories must be obtained as a single-source membrane system to ensure total system compatibility and integrity.

B. Fire Performance Characteristics: Provide water-resistive barrier meeting the following fire-test characteristics.

1. Surface-Burning Characteristics: ASTM E 84 Class A Rated

1.07 MOCK-UP

A. Construct mock-up in accordance with Section 01 43 39 – Mock-ups.

B. Provide mock-up of specified water-resistive vapor permeable air barrier materials under provisions of Section 01 33 23 - Shop Drawings, Product Data and Samples.

C. Where directed by Architect or Owner, construct typical exterior wall panel, 6-foot-long by 6-foot wide incorporating the sheathing board or substrate, sill pan protection system, window frame and attachment method, clips, strapping or masonry ties, attachment of insulation and detailing of water-resistive vapor permeable air barrier membrane application, transitions and lap seams.

1. Perform water spray test of mockup to demonstrate performance.

D. Allow 48 hours for inspection of mock-up by Architect and Owner before proceeding with water-resistive vapor permeable air barrier work. Mock-up may remain as part of the Work.

1.08 PRE-INSTALLATION CONFERENCE

A. Contractor shall convene [one] week prior to commencing Work of this section, under provisions of Section 01 31 19 – Project Meetings.

B. Ensure all contractors responsible for creating a continuous plane of water and air tightness are present.

1.09 DELIVERY, STORAGE AND HANDLING

A. Refer to current manufacturer's product literature for storage and handling.

B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

C. Store roll materials on end in original packaging. Protect rolls from direct sunlight and inclement weather until ready for use.

D. Wasted Management and Disposal

1. Separate and recycle waste materials in accordance with Section 01 74 19 – Construction Waste Management, and with the Waste Reduction Work Plan.

1.10 COORDINATION

A. Ensure continuity and proper shingling of the self-adhered water-resistive vapor permeable air barrier system throughout the scope of this section.

1.12 WARRANTY

A. Provide manufacturer's standard material warranty in which manufacturer agrees to provide replacement material for the self-adhered water-resistive vapor permeable air barrier sheets installed in accordance with manufacturer's instructions that fails due to material defects within 20 years of the date of Purchase.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Primary self-adhered water-resistive vapor permeable air barrier membrane components and accessories must be obtained as a single-source to ensure total system compatibility and integrity.

1. Basis of Design: Self-Adhered water-resistive vapor permeable air barrier membrane by VaproShield LLC., represented by W.H. Steele Co., phone (909) 930-0831. www.vaproshield.com.
2. Or Approved Equal Weather Barrier System.

B. WATER-RESISTIVE VAPOR PERMEABLE AIR BARRIER MATERIALS

1. Primary self-adhered air barrier sheet membrane shall be RevealShield SA® Self-Adhered Water-Resistive Vapor Permeable Air Barrier Sheet by VaproShield, a zero VOC self-adhered vapor permeable air barrier sheet membrane consisting of multiple layers of UV stabilized proprietary membrane having the following properties:
   a. Color: Black (exterior) with allowable UV exposure for 180 days
   b. Air Leakage: <0.01 cfm/ft. sq. when tested in accordance with ASTM E 2357 and < 0.0000263 cfm/sq. ft. @ 75 Pa (0.000134 L/s/m sq @ 75 Pa) when tested in accordance with ASTM E 2178
   c. Water Vapor Permeance tested to ASTM E 96 Method B: minimum 40 perms
   d. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage
   e. Tensile Strength tested to ASTM D 882: 44.8 lbf/inch (78 N/mm), machine direction; 25 lbf/inch (43.8 N/mm), cross-machine direction
   f. Application Temperature: Ambient temperature must be above 20 degrees F
   g. Surface Burning Characteristics tested to ASTM E 84: Class A
   h. Physical Dimensions: 0.026 inches (0.65 mm) thick and 59 inches (1.5 m) wide and minimum 10 oz per sq. yd.

C. WATER-RESISTIVE VAPOR PERMEABLE TRANSITION AND FLASHING MEMBRANE

1. Self-adhered air barrier transition and flashing membrane shall be RevealFlashing SA™ by VaproShield, a zero VOC self-adhered water-resistive vapor permeable membrane having the following properties:
   a. RevealFlashing SA™ Black: 11-3/4 inches x 100 feet long
   b. Air Leakage: < 0.0000263 cfm/sq. ft. @ 75 Pa (0.000134 L/s/m sq @ 75 Pa) when tested in accordance with ASTM E 2178
   c. Water Vapor Permeance tested to ASTM E 96 Method B: minimum 40 perms
   d. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage

D. VAPROLIQUI-FLASH™ VAPOR PERMEABLE WATER RESISTIVE FLASHING FOR ROUGH OPENINGS

1. Window and door flashing shall be Vapro Liqui-Flash by VaproShield, a liquid-applied vapor permeable air barrier flashing material with vapor permeance and resistance to air leakage properties compatible with the primary air barrier membrane.

E. WATER-RESISTIVE WEATHER BARRIER BATTEN ACCESSORIES
1. Water-resistive weather barrier batten accessories by VaproShield shall be made of black PVC material
a. VaproBatten™: Black vinyl extrusion with pre-formed fastener and moisture drainage channels configured to create a ventilated airspace between wall cladding and weather-resistive air barrier.

F. DRAINAGE MAT ACCESSORIES
1. Hydrophobic filter fabric and polypropylene drainage matrix to be installed over VaproShield.
a. VaproMat™: 7mm Drainage Mat to be installed behind Stucco Lath and Rainscreen batten systems, Meeting ASTM E84 Class A for Flame Spread and Smoke Developed.

2.02 PENETRATION SEALANT
A. Provide sealant for penetrations as recommended by manufacturer and as specified under Division 07 Section: Sealants. Appropriate sealants shall be Dow 758 or VaproLiqui-Flash.

PART 3 EXECUTION

3.01 GENERAL
A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
B. All surfaces must be dry, sound, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the water resistive air barrier membrane and flashings. Fill voids and gaps in substrate greater than ¼ inch in width to provide an even surface. Strike masonry joints full-flush.
C. Minimum application temperature self-adhered membrane and flashings to be above 20 degrees F (minus 6.0 degrees C).
D. Ensure all preparatory Work is complete prior to applying primary self-adhered vapor permeable air barrier sheet membrane.
E. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.02 COORDINATION OF SELF-ADHERED VAPOR PERMEABLE AIR BARRIER MEMBRANE INSTALLATION
A. Self-adhered vapor permeable air barrier sheets may be installed vertically or horizontally over the outside face of exterior sheathing board or substrate.
B. Complete detail Work around corners, wall openings, building transitions and penetrations prior to field applications.

C. Install self-adhered vapor permeable air barrier sheet over the outside face of exterior sheathing board or substrate, measure and pre-cut into manageable sized sheets to suit the application conditions.
D. Install self-adhered vapor permeable air barrier sheet complete and continuous to substrate in a sequential overlapping weatherboard method starting at bottom or base of wall and working up.
E. Stagger all end lap seams.
F. Roll installed membrane with roller to ensure positive contact and adhesion with substrate.

3.03 BUILDING TRANSITION CONDITIONS

A. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials with self-adhering air barrier transition and flashing membrane.
B. Align and position self-adhered air barrier transition and flashing membrane, remove protective film and press firmly into place. Provide minimum 3-inch lap on to substrates.
C. Ensure minimum 3 inch overlap at side and end laps of membrane.
D. Roll membrane and lap seams with roller to ensure positive contact and adhesion.
E. At inside and outside corners provide minimum 12 inch off-set of vertical seams.

3.04 MECHANICAL EQUIPMENT PENETRATIONS

A. Mechanical pipe, electrical conduit and/or duct work must be secured solid into position prior to installation of self-adhered vapor permeable air barrier membrane.
B. Electrical services penetrating the wall assembly and self-adhered vapor permeable air barrier membrane must be placed in appropriate conduit and secured solid into position.
C. Install manufactured flanged penetration sleeves as recommended by sleeve manufacturer.
D. For straight sided penetrations, cut and fit self-adhered vapor permeable air barrier to accommodate sleeve, install specified single sided flashing tape to seal the air barrier membrane to ductwork or preformed flange sleeve.
E. For all penetrations, refer to manufacturer’s current standard details at www.vaproshield.com

3.05 VERTICAL APPLICATIONS

A. For vertical applications, align sheets with an ‘inside’ or ‘outside’ corner to avoid wrinkles and miss-alignment of subsequent applications.
B. Measure and pre-cut into manageable sized self-adhered sheets to suit the application conditions.
C. Hang self-adhered sheets over wall and extend down to lowest point of wall. Allow for excess material at bottom of wall to accommodate tie-ins and connections to adjacent surfaces.
D. Align and position self-adhered membrane, remove release film and press firmly into place. Provide minimum 3 inch overlap at side and end laps of membrane. Roll membrane and lap seams with roller to ensure contact and adhesion.
E. Continue to remove release film and apply pressure to ensure positive contact onto wall substrate.
F. Install subsequent sheets of self-adhered vapor permeable air barrier sheets in overlapping weatherboard format. Ensure sheets lay smooth and flat to surfaces. Roll membrane and lap seams with roller to ensure contact and adhesion.

3.06 HORIZONTAL APPLICATIONS

A. For horizontal applications, align sheets and begin installation of water-resistive weather barrier at bottom or lowest point of wall.
B. To avoid wrinkles and miss-alignment of subsequent applications it is recommended to pre-mark or "Snap" a level line to work from. Measure and pre-cut into manageable sized sheets to suit the application conditions.
C. Allow for excess material at bottom of wall to accommodate tie-ins and connections to adjacent surfaces.

D. Align and position self-adhered membrane, remove release film and press firmly into place. Provide minimum 3 inch overlap at all side and end laps of membrane. Roll membrane and lap seams with roller to ensure contact and adhesion.
E. Continue to remove release film and apply pressure to ensure positive contact onto wall substrate.
F. Install subsequent sheets of self-adhered vapor permeable air barrier sheets in overlapping weatherboard format. Ensure sheets lay smooth and flat to surfaces. Roll membrane and lap seams with roller to ensure contact and adhesion.

3.07 BATTENS FOR RAIN SCREEN CLADDING SYSTEMS
A. Provide and install specified battens under cladding systems.
B. Coordinate spacing of battens to accommodate cladding system.

3.08 FASTENING CLIPS AND MASONRY TIES
A. Install clips and masonry ties over primary self-adhered vapor permeable air barrier membrane.
B. Secure clips and masonry ties with corrosion-resistant, or stainless steel screws with gasketed fasteners.
C. Consult VaproShield Technical Services for recommendations on appropriate masonry tie types and methods to seal penetrations.

3.09 FIELD QUALITY CONTROL
A. Make notification of when sections of work are complete to allow review prior to covering self-adhered water-resistive vapor permeable air barrier system.
B. Owner to engage independent consultant to observe substrate and membrane installation prior to placement of cladding systems and provide written documentation of observations.
C. Manufacturer’s Field Services: Upon Owner’s request, provide manufacturer’s field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer’s instructions.

3.10 PROTECTION
A. Protect wall areas covered with self-adhered water-resistive vapor permeable air barrier from damage due to construction activities, high wind conditions, and extended exposure to inclement weather.
B. Review condition of self-adhered water-resistive vapor permeable air barrier prior to installation of cladding. Repair, or remove and replace damaged sections with new membrane.
C. Recommend to cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed self-adhered water-resistive vapor permeable air barrier installations.
D. Remove and replace water-resistive weather barrier membrane affected by chemical spills or surfactants.

END OF SECTION 07 25 00

SECTION 07 26 00

VAPOR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

Products supplied under this section:

1. Vapor barrier and installation accessories for installation under concrete slabs.

Related sections:

1. Section 03 30 00 Cast-in-Place Concrete

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E1745- 11Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E1643- 11Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. Technical Reference - American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
   2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

1.3 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results per paragraph 9.3 of ASTM E1745.
   2. Manufacturer's samples and literature.
   3. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
   4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all of the following qualities:
   1. Maintain permeance of less than 0.01 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
   2. Other performance criteria:
      a. Strength: ASTM E1745 Class A.
      b. Thickness: 15 mils minimum

3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

B. Vapor barrier products:
1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
2. Or Approved Equal.

2.2 ACCESSORIES

A. Seams:
1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

B. Sealing Penetrations of Vapor barrier:
1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

C. Perimeter/edge seal:
1. Stego Crete Claw by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
3. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

D. Penetration Prevention:
1. Beast Foot by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

E. Vapor Barrier-Safe Screed System
1. Beast Screed by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Geotechnical Engineer.
1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance ASTM E1643.
1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.

a. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.

3. Overlap joints 6 inches and seal with manufacturer's seam tape.
4. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
5. Seal all penetrations (including pipes) per manufacturer's instructions.
6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use blunt-end and/or threaded nail stakes (screed pad posts) and insert them into Beast Foot. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier
7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
9. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION 07 26 00

SECTION 07 41 13
CORRUGATED METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Corrugated metal roof panels, including trim accessories.

B. Related Sections: Section(s) related to this section include:

1. 05 50 00 Metal Fabrications.
2. 05 12 00 Structural Steel Framing

1.2 REFERENCES

A. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
2. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
3. ASTM D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
4. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

C. Underwriters Laboratories (UL):

2. UL 580 - Tests For Uplift Resistance of Roof Assemblies.
3. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.

D. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): "Architectural Sheet Metal Manual."

1.4 ACTION SUBMITTALS

A. Product Technical Data: For each type of product required, including manufacturer's preparation recommendations, storage and handling requirements, and recommended installation methods.

B. Shop Drawings: Showing methods of installation, plans, sections, elevations and details of roof panels indicating flashings, edge trim, gutters and downspouts, sealants and interfaces with all materials not supplied by the metal panel system manufacturer, and identification of proposed component parts and their finishes. Do not proceed with fabrication prior to approval of shop drawings.

C. Samples: Verification samples for finishes, colors and textures.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.

B. Warranty: Warranty documents required in this section.

1.6 QUALITY ASSURANCE

A. Fire Resistance Ratings: Determined by testing identical products and assemblies according to UL 263 and UL 790 by a testing agency acceptable to authorities having jurisdiction.

1. Flame-Spread Index: Meeting ASTM E84 25 (Class A)

1.8 DELIVERY, STORAGE AND HANDLING

A. General: Comply with manufacturer’s current printed product storage recommendations.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage: Store materials above ground, under waterproof covering, protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Provide proper ventilation of metal panel system to prevent condensation build-up between each panel and trim or flashing component. Tilt stack to drain in wet conditions. Remove strippable plastic film before storage under high-heat conditions. Store products in manufacturer's unopened packaging until just prior to installation.

D. Handling: Exercise caution in unloading and handling metal panel system to prevent bending, warping, twisting and surface damage.

1.9 WARRANTY

A. Special Exposed Panel Finish Warranty: Manufacturer's standard form PVDF (Fluorocarbon) System Warranty for film integrity, chalk rating and fade rating in which manufacturer agrees to repair or replace panels that show evidence of deterioration within specified warranty period.

1. Deterioration shall include but is not limited to:

a. Color fading of more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling or failure of paint to adhere to bare metal.

2. Warranty Period: Film integrity for 20 years and chalk and fade rating for 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL ROOF PANELS

A. Basis of Design Product: Subject to compliance with requirements provide AEP Span, Corrugated 'Nu-Wave' Panel, as manufactured by AEP Span, California Sales Rep. Jeffrey Medeiros, 916.207.0385
B. Or approved Equal

C. Product:

1. Panel coverage: 34 1/2 inches.
2. Rib Height: 7/8 inch.
3. Material: Steel, 22 gauge thickness.
4. Minimum Roof Slope Capability: 3:12 min..
5. Attachment: Exposed direct fastened panel using #12-14x 2 1/8" SX5 stainless steel TEK screw swith EPDM/metal washer.
6. Application: Designed for application over open framing.
7. Rib Configuration: Sinusoidal.
8. Surface Finish: PVDF (Duratech).
9. Color: Matching AEP Span Rustic Color 'Sedona Rust'.
10. Fire Resistance Rating: Comply with UL 263 and UL 790 Class A Fire Resistance Ratings.

2.5 ACCESSORIES

A. Products: Related sheet metal flashing and trim to form drip edges, ridge and rake flashings as needed to form complete system, and as indicated on drawings.

B. Accessory Finish Color: Matching roof panel color.

2.6 SOURCE QUALITY CONTROL

A. Source: Obtain architectural metal roof panels, trim and other accessories from a single manufacturer.

B. Quality Control: Obtain architectural metal roof panels, trim and other accessories from a manufacturer capable of providing on-site technical support and installation assistance.

PART 3 - EXECUTION

3.1 ARCHITECTURAL METAL ROOF PANEL INSTALLATION

A. General: Comply with panel manufacturer’s installation instructions including but not limited to special techniques, interface with other work, and integration of systems.

B. Fasten metal roof panels to supports with Stainless Steel fasteners meeting manufacturers requirements. concealed clips at each standing-seam joint at location, spacing, and using proper fasteners as recommended by panel manufacturer.

3.6 ACCESSORY INSTALLATION

A. General: Install accessories using techniques recommended by manufacturer and which will assure positive anchorage to building and weather tight mounting. Provide for thermal movement. Coordinate installation with flashings and other components.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and the SMACNA "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and install units to true level. Install work with laps, joints, and seams that will be permanently watertight.

3.8 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any installed products that have been damaged.

C. Clean installed panels in accordance with manufacturer's instructions prior to Owner's acceptance.

D. Remove and lawfully dispose of construction debris from Project site.

3.9 PROTECTION

A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION 07 41 13

SECTION 07 41 14

STANDING SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished, prefabricated standing seam roof system with continuous seams.

B. Related Requirements:
1. Section 07 21 00: Thermal Insulation.
2. Section 07 62 00: Sheet Metal Flashing and Trim
3. Section 07 92 00: Joint Sealants.

1.2 REFERENCES

A. Reference Standards:
1. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
2. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM A792: Steel Sheet, 55 % Aluminum Zinc Alloy Coated by the Hot Dip Process.
4. ASTM C1371: Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549: Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D523: Specular Gloss.
7. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
8. ASTM E283: Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
9. ASTM E331: Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
10. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.
11. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.
12. CRRC-1 Method #1: Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer.
13. SMACNA Architectural Sheet Metal Manual.
14. UL 580: Standard for Tests for Uplift Resistance of Roof Assemblies
15. US Environmental Protection Agency: Energy Star Reflective Roof Products
16. US Green Building Council (USGBC): Leadership in Energy and Environmental Design (LEED)

1.3 SUBMITTALS

A. Product Data.

B. Shop Drawings:
   1. Indicate thickness and dimensions of parts, fastenings and anchoring methods, details and locations of joints, transitions and other provisions necessary for thermal expansion and contraction.
   2. Indicate locations of field- and factory-applied sealant.

C. Samples:
   1. Submit two samples, 12 inches long by full panel width, showing proposed metal thickness and seam profile.
   2. Submit standard color samples of metal for Architect's selection.

D. Test Reports: Indicating compliance of products with project requirements.

E. LEED Submittals:
   1. LEED Credit SS 7.2 – Heat Island Effect – Roof: Product data indicating Solar Reflectance Index (SRI) of roof panels.
   2. LEED Credit MR 4 – Recycled Content: Product data indicating percentage by weight of post-consumer and post-industrial recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

F. Warranty Documentation.

G. Insurance Documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Keep panels and accessory items dry.
   2. Protect against damage and discoloration.
   3. Handle panels with non-marring slings.
   4. Support panels to prevent permanent deformation.
   5. Store panels above ground, with one end elevated for drainage.
   6. Protect panels against standing water and condensation between adjacent surfaces.
   7. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and keep sheets separate for air-drying.
   8. Painted panels shall be shipped with protective plastic sheeting or a strippable film coating between panels. Remove strippable film coating prior to installation. Do not allow strippable film coating to remain on panels in extreme heat, cold, or direct sunlight or other UV source.
   9. Do not allow panels to contact treated lumber.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard 20-year full system weathertightness warranty and finish warranties, stating the following:
   1. Architectural fluorocarbon finish:

a. Will be free of fading or color change in excess of 5 Hunter delta-E units as determined by ASTM D2244-02.
b. Will not chalk in excess of numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214-98 method D659.
c. Will not peel, crack, chip, or delaminate.

2. Metal Roofing and Flashings assemblies will not leak.

B. Installer's Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain roof panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.

1. Furnish written warranty, signed by installer.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Products: The following establishes a Basis of Design. Provide the following or approved equal:

1. AEP Span, a Division of ASC Profiles, Inc., Span-Seam with 2” high 180 degree mechanically seamed edges.

B. Performance Criteria

1. Wind Uplift: Class 90 per UL 580-Select applicable UL construction number below.
   a. Panel system shall be ASTM E1592 tested under the supervision of an ANSI or ISO/IEC accredited laboratory and the laboratory shall issue the test report.
   b. Select Seam Narrow Batten UL Construction #397, minimum 24 gauge panels, when installed over minimum 5/8” nominal plywood decking, with roof panel fastener clips spaced 24” on center maximum.
2. Air Infiltration: <0.02 cfm per linear foot of joint when tested in accordance with ASTM E 283 at static test pressure differential of 20.0 psf.
3. Water Penetration Under Static Pressure: No leakage through panel joints when tested in accordance with ASTM E 331 at static test pressure differential of 25.0 psf.
4. Thermal Movements: Accommodate thermal movement without buckling, joint opening, overstressing components, failure of connections, or other detrimental effects, through the following temperature changes:
   a. 120 degrees F, ambient.
   b. 180 degrees F, material surface.

2.2 PANELS

A. Panels: AEP Span, a Division of ASC Profiles, Inc.; Preformed Metal Standing Seam Roofing – Span-Seam.

1. Material: Steel conforming to ASTM A792.
   a. 24 Gauge: Yield strength 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.
   b. 12-inch panel width, flat pan.

2. Panel Rib Height:
   a. Mechanically Seamed 2” high rib, span-seam 180 degree seam.

3. Panel Finish: Provide primer and top finish coat on exposed faces; provide primer and backer coat on concealed faces of panels.
   a. DuraTech® 5000: Polyvinylidine Fluoride, full 70 percent Kynar 500®or Hylar 5000®, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.
   b. Panel Color: Premium Color, “Rustic- Sedona Rust”.
4. Seam Sealant: Factory apply high-grade butyl mastic sealant within the confines of narrow batten, designed to seal against adjacent male panel legs.

2.3 FRAMING AND SUBSTRATES

A. Sheathing: See Section 06 16 00 "Sheathing".

B. Roofing Underlayment:
   1. Self-Adhering Sheet Underlayment: Grace Ultra- Self Adhered Roof Underlayment
   2. WaterWay 3mm (1/8”) Drainage Mat over sheet underlayment and under metal roof panels.

2.4 CLIPS AND FASTENERS

A. Clips: UL-90 assembly rated clip: 24 gauge coated with minimum AZ-50 Zinc-Aluminum coating per ASTM A792.

B. Bearing Plate: 22ga minimum See Metal Construction Association Technical Bulletin "Fastener Selection". Usually retain first option; retain second option if UL Class 90 is required.

A. Fasteners: As recommended by manufacturer for performance indicated, and meeting UL Class 90.

2.5 INSULATION

A. Rigid Insulation: Rigid Polyisocyanurate

   1. A rigid polyisocyanurate foam insulation with black mat facers. Polyisocyanurate insulation is available in 4 ft x 4 ft sizes and shall include a total thickness of 2 inches. Install insulation in a minimum of two layers. Consult Product Data Sheet for additional information.

B. ACCESSORIES

C. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in Drawings.

1. Provide manufacturer's standard accessories and other items essential to completeness of standing seam roof installation.

D. Panel Penetration Flashings: As recommended by panel manufacturer; designed to provide sufficient movement to prevent creation of points of fixity at penetrations.

E. Sealant for Field Application: [high grade non-curing butyl or curing urethane sealant as recommended by panel manufacturer. Do not use sealant containing asphalt.] [See Section 07 92 00 "Joint Sealants".]

2.6 FABRICATION

A. Fabrication, General:
1. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous lengths and fabricate flashings and accessories in longest practical lengths. Contact AEP Span if panel lengths required over 60 feet.
2. Panels shall be factory correctively-leveled.

B. Panels:
1. Provide panels in full length from ridge to eave when possible.
2. Where single length panels are not practical, provide mated swaged panels for positive joint end laps, shingled to accommodate water run-off (fabricated with overlap in direction of water flow).
3. Roof panels shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations which create voids and requiring supplemental closure devices shall not be considered acceptable.
4. Engineer panels to use concealed anchors that permit expansion and contraction, except at eaves, end laps, ridges, valleys, hips and gables.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: With Installer present.
1. Examine conditions and substrates on which metal panels are to be installed. Structural support or substrate shall be flat and plumb to avoid panel stresses and distortion.
2. Prior to starting work, correct defects.

B. Field Measurements:
1. Coordinate field measurements and fabrication schedule with construction progress.
2. Field measure prior to fabrication. Show recorded dimensions on shop drawings, including locations of shop-fabricated openings.
3. If field measurements differ from drawing dimensions, notify Architect prior to fabrication.

C. Substrate Tolerances: Deviations from flat plane shall not exceed the following.
1. 1/4 inch in 20 feet.

2. 1/2 inch across building elevation.
3. 1/8 inch in 5 feet.

3.2 PREPARATION

A. Substrate and Underlayment: Install according to approved shop drawings and metal panel manufacturer's recommendations.

3.3 INSTALLATION

A. Panels and Trim: Comply with manufacturer's instructions for assembly, installation and erection for weather tight installation.
   1. Install according to approved shop drawings.
   2. Install panels in accordance with manufacturer’s instructions and recommendations. Anchor securely in place using clips and fasteners spaced in accordance with manufacturer’s recommendations for design wind load criteria.
   3. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.
   4. Discrepancies between job site conditions and shop drawings shall be brought to the attention of the Architect for resolution.
   5. Cutting and Fitting:
      a. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.
      b. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.
      c. Openings less than 6 inches: Field cutting is acceptable.
   6. Dissimilar Metals or Materials:
      a. Where panel or trim may come in contact with dissimilar metals or treated lumber, fabricate transition to facilitate drainage and minimize possibility of galvanic action. Galvanic action can cause panels and trim to fail prematurely.
      b. At points of contact with dissimilar metal or treated lumber, coat panel and trim with protective paint or separate materials with a weatherproof underlayment.
      c. Direct contact or run-off from CCA, ACQ, CA, or other treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes or siding can cause panels and trim to fail prematurely. Avoid contact with these materials.

B. Accessories: Install trims, flashings, and roofing specialties according to Drawings and manufacturer's recommended details.

C. Sealant Installation: Apply according to approved shop drawings and SMACNA Architectural Sheet Metal Manual recommendations.
   1. Provide airtight and waterproof installation.

3.4 CLEANING

A. Repairs:

1. Touch up paint is not required for panels with scratches that do not expose metal.
2. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.

B. Cleaning and Waste Management: See Division 01 Section "Construction Waste Management and Disposal" for recycling requirements.
1. At completion of each day's work and at work completion, sweep panels, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate.
2. Clean exposed surfaces of work promptly after completion of installation.

3.5 PROTECTION

A. Protect Work as required to ensure that roofing will be without damage at Final Completion.

END OF SECTION 07 41 14

SECTION 07 54 19.11

ADHERED THERMOPLASTIC PVC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This specifies the scope of work for the following adhered PVC membrane roofing system.

1. Assembly

a. Properly prepare plywood substrate to receive new roofing materials.
b. 1/4-inch DensDeck Prime mechanically attached through insulation into plywood deck using #12 Sarnafasteners and 3-inch square Sarnaplates.
c. EnergySmart Reflective Gray G410 60 mil fiberglass reinforced PVC roof membrane adhered to DensDeck Prime with 2121 water-based membrane adhesive.
d. Sarnatred walkway to be installed per drawings.
e. 20-year System warranty to be provided upon completion.

B. Related Work

1. Substrate Preparation
2. Roof Drains
3. Wood Blocking
4. Roof Board
5. Roof Membrane
6. Fasteners
7. Adhesives
8. Roof Membrane Flashings
9. Walkways
10. Metal Flashings
11. Sealants

1.2 REFERENCES

A. Current Edition of: Identified reference requirements as put forth by the project specification.

1. State Building Code
2. International Building Code (IBC)
3. American Society of Testing Materials (ASTM)
4. National Roofing Contractors Association (NRCA)
5. Single Ply Roofing Institute (SPRI)
6. PVC Manufacturer Roofing Applicator Handbook
7. Technical Bulletins

1.3 SUBMITTALS

A. Literature: Copies of current relevant information pertaining to the primary components to be used in the roof system including but not limited to:

1. Specification
2. PVC Roofing Manufacturer – System Roofing Warranty
3. Applicator Warranty
4. Product Data Sheets
5. Safety Data Sheets
6. UL listings/approvals
7. UL Environment validation of recycling claims
8. At time of bidding, Applicator must submit written documentation that items are met as set forth in Quality Assurance 1.4.A and 1.4.B.

B. Samples for Verification: Representative samples of primary components to be used in the roof system.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of roof deck, orientation of roofing membrane, pattern for insulation attachment, and membrane fastening spacing.
4. Fastening patterns for corner, perimeter, and field-of-roof locations.

1.4 QUALITY ASSURANCE

A. Roofing Manufacturer Qualifications:

1. Membrane must be a MINIMUM of 60 mils, exclusive of any felt or fleece backing. ASTM nominal (+/-) 10% mil thickness tolerance is not accepted.
2. Membrane must have a fiberglass reinforced scrim for the specified adhered membrane roofing system. Polyester reinforced membranes are not accepted.
3. Manufactured by membrane supplier and not private labeled.
4. TPO membranes are not accepted.
5. Membranes that require or suggest the use of cut-edge sealant are not accepted.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. PVC Roofing Manufacturer Representative, Designer, Owner's Representative, Roofing Installer and installers whose work interface with or affects roofing.
2. Review methods and procedures related to roofing installation, including manufacturer's most current requirements.
3. Review base flashings, special roofing details and transitions, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
4. Review governing regulations and requirements for insurance and certificates.
5. Review temporary protection requirements for roofing system during and after installation.

6. Deviations from the project specifications or the approved shop drawings are not permitted without prior written approval by PVC roofing Manufacturer, the Owner, the Owner's Representative, and the Designer.

C. Fire Design:

1. Underwriters Laboratories, Inc. – Class A Assembly

D. Wind Design:

1. 60 mph maximum wind speed

E. Special Design:

1. California Energy Commission Title 24
2. SCAQMD
3. IECC
4. Energy Star

1.5 DELIVERY, HANDLING, AND STORAGE

A. Deliver roofing materials to project site in original containers with seals unbroken and labeled with product manufacturer's name or product brand name.

B. Comply with most current product data sheet requirements when handling, storing, protecting, or installing roofing materials. Including but not limited to avoiding physical damage, deterioration by sunlight, excessive moisture, or other potentially damaging conditions.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location; away from direct sunlight; within the temperature range noted on the product data sheet.

D. Handle and store roofing materials and equipment in a manner to avoid permanent deflection of deck.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's most current requirements and warranty requirements.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required and confirmed by roofing manufacturer.

1.7 WARRANTY

A. Manufacturer 20-year System Roofing Warranty: Manufacturer warrants to the owner the specified warranty for the specified warranty period provided roofing is installed according to Manufacturer's Technical instructions by an Authorized Roofing Applicator. The warranty shall

not have a penal sum limitation, shall be non-prorated and shall not exclude coverage due to ponding water. Any items not purchased directly from Manufacturer are not included in the System Warranty.

B. Applicator's 2-year Warranty: Signed by installing applicator, covering the work of a System Warranty, including all components of roofing system installation such as membrane roofing, base flashing, fasteners and walkway products.

PART 2 - PRODUCTS

2.1 PERFORMANCE / DESIGN CRITERIA

A. ASTM D4434: Type II, fiberglass reinforced
B. NSF/ANSI Standard 347: Silver
C. Guarantee membrane thickness meets or exceeds specified thickness when tested according to ASTM D751

2.2 ROOFING MATERIALS

A. Approved Membrane Manufacturer or approved equal

1. Basis of Design - Sika Sarnafil, 60 mil G410: 15616 Euclid Avenue, Chino, CA 91710, Ph. 714.837.8299.

B. PVC Sheet

1. Thermoplastic PVC membrane, fiberglass scrim reinforcement, with lacquer coating.

C. PVC Sheet Minimum Thickness

1. 60 mil, MINIMUM, exclusive of any felt or fleece backing. Membrane thickness must be no less than 60 mils. ASTM nominal, (+/-) 10% tolerance of actual thickness, is not accepted.

D. PVC Sheet Thickness Over Scrim Reinforcement

1. 27 mil, membrane must have at least 27 mils of waterproofing polymer thickness over scrim reinforcement as documented on the manufacturer's published product data sheet.

E. PVC Sheet Exposed Face Color

1. Title 24 compliant EnergySmart Reflective Gray

F. Membrane Attachment Component

1. 2121 Membrane Adhesive: Water-based adhesive used to attach membrane to horizontal or near-horizontal substrates.

G. Roof Board or Insulation Attachment Components

1. Sarnafastener #12: Corrosion-resistant fastener used with plates to attach insulation and/or roof boards to steel or wood roof decks. Provided in lengths up to 8 inches.
2. Sarnaplate: Specially-designed stress plate used with #12 and #15 fasteners to attach insulation and/or roof boards directly to approved roof decks. Plate has a high-rib design to increase strength and to provide protection to the membrane underside from abrasion by the fastener head. Plate is 3-inch square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating to meet Factory Mutual 4470 criteria for corrosion resistance.

H. Roof Board

1. 1/4-inch DensDeck Prime: Surface Water Absorption (ASTM C473): Nominal 1.0 grams, glass-mat, water-resistant gypsum board.

I. Flashing Materials

1. Wall/Curb Flashing
   a. G410 PVC Flashing Membrane: 60 mil fiberglass reinforced membrane adhered to approved substrate using approved flashing adhesive.
   b. PVC Detail Membrane: 60 mil fiberglass reinforced pliable PVC membrane for flashing pipes, corners, and penetrations.
   c. PVC Clad Metal: PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 24 gauge, G90 galvanized metal sheet with a 20-mil unsupported PVC membrane laminated on one side. The dimensions of clad are 4 ft. x 10 ft.

2. Perimeter Edge Flashing
   a. PVC Clad Metal: PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 24 gauge, G90 galvanized metal sheet with a 20-mil unsupported PVC membrane laminated on one side. The dimensions of clad are 4 ft. x 10 ft.

3. Miscellaneous Flashing Accessories
   a. PVC Circles: 60 mil thick prefabricated 4-1/2 in. round circle patch injection molded.
   b. PVC Corners: 60 mil thick prefabricated inside and outside corners injection molded.
   c. PVC Stack: 60 mil thick prefabricated stack/pipe boot injection molded.
   d. Reglet Termination Bar: Heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs.
   e. Stabond Adhesive: Solvent-based reactivating adhesive approved by Manufacturer used to attach fiberglass reinforced PVC membrane to flashing substrate.

J. Miscellaneous Materials

1. Accessories
   a. Aluminum Tape: 2-inch wide pressure-sensitive aluminum tape used as a separation layer between small areas of any asphalt contamination and the membrane and as a bond-breaker under the cover strip at clad joints.
   b. Perimeter Warning Membrane: Perimeter Warning Membrane is made from fiberglass reinforced flashing membrane, yellow in color, and is 4-inch wide and 100 ft long.
   c. Seam Cleaner: Cleaner used on PVC membranes to clean the in the seam area only.

d. Peel Stop: 1-inch wide, 1/8-inch-thick, flat aluminum bar that has predrilled holes every 6 inches on center used with approved fasteners at walls/curbs terminations, penetrations and at incline changes of the substrate.

2. Sealants
   a. Sikaflex-1a Sealant: Premium-grade, high-performance, moisture-cured, one-component polyurethane-based, non-sag elastomeric sealant used in wall, curb and drain terminations. It is also used as a sealant at pipe penetrations and under certain metal flashings.
   b. Multi-Purpose Tape: High performance sealant tape used with metal flashings as a preventive measure against air and wind-blown moisture entry.

3. Temporary Overnight Tie-ins (must be removed prior to start of next day's roofing):
   a. Multiple layers of roofing cement and felt
   b. Mechanical attachment with rigid bars and compressed sealant

K. Walkway Protection

1. Sarnatred-V Walkway: Polyester reinforced, 96 mil, weldable membrane with surface embossment similar to a chevron pattern. Color: light gray.

L. Nailers and Blocking

1. Wood, #2 quality or better, Wolmanized or Osmose treated for fire and rot resistance.
2. Plywood, minimum 1/2-inch CDX (C side out).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Applicator shall verify that the work done under related sections meets the following conditions:

1. Roof drains and scuppers have been installed properly, or reconditioned, or replaced.
2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
3. All surfaces are smooth and free of dirt, debris and incompatible materials.
4. For concrete deck, verify that concrete substrate is dry and free of moisture. Verify that concrete curing compounds and debris that will impair adhesion of roofing components to roof deck have been removed.
5. All roof surfaces shall be free of water.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's most current requirements. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and flashings and from spilling or migrating onto surfaces of other construction. Remove roof drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION

A. Install roofing system according to product manufacturer's most current requirements including but not limited to roofing applicator handbook, product data sheets, specifications, and or relevant technical bulletins.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. For tie-in with existing roofing, install roofing and auxiliary materials to maintain weather tightness of transitions.

3.4 INSULATION / ROOF BOARD INSTALLATION

A. Coordinate installing roofing system components so roof boards are not exposed to precipitation or other sources of moisture.

B. Comply with product manufacturer's most current requirements for installing roof boards.

C. Install tapered insulation to conform to slopes indicated.

D. Trim roof boards where necessary at roof drains so completed surface is smooth and does not restrict flow of water.

E. Properly sump drains to allow membrane to sit flat without stretching or wrinkling.

F. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Installation Method:

1. Mechanically Fastened: Install each layer of insulation and secure by fastening top layer to deck using mechanical fasteners specifically designed and sized for fastening specified board-type to deck type at the spacing rate according to Sika Sarnafil and Owner’s Representative/Designer.

3.5 ROOFING MEMBRANE INSTALLATION

A. The surface of the insulation or substrate shall be inspected prior to installation of the PVC roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

B. Accurately align roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Apply roofing with side laps shingled with slope of roof deck where possible.

D. Make sure seam areas are free of debris, dirt, and dust, overlap membrane sheets, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's most current requirements to ensure a watertight seam installation.

1. Verify in-field weld strength of seams a minimum of twice daily, repair seam sample areas.
2. Test lap edges with probe to verify seam weld continuity.
3. If any tears or voids in lapped seams are found repair using appropriate approved technique.

E. Adhered System:

1. Water Based Adhesive:

Apply approved 2121 water-based adhesive to the properly prepared substrate as required by roofing Manufacturer. Place membrane into wet adhesive and immediately broom and roll with minimum 100 lb steel membrane roller. Adhesive shall not be used if temperatures below 40°F are expected during application or subsequent drying time.

3.6 BASE / FIELD FLASHING INSTALLATION

A. Install all membrane and preformed flashings according to roofing system manufacturer's most current requirements.

B. Install membrane base flashing by applying bonding adhesive to substrate and underside of membrane flashing at required rate. Do not apply to seam area of flashing.

C. Flash field penetrations and inside/outside corners with appropriate prefab flashing components or by approved custom in-field fabrication technique.

D. Firmly roll membrane flashing into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of membrane flashings and mechanically anchor to substrate according to manufacturer requirements.

F. Spread continuous sealant bead leaving no gaps over deck drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.7 WALKWAY INSTALLATION

A. Sarnatred-V Walkway: Install walkway product in locations indicated, adhere (except edges) to deck sheet, and hot-air weld edges.

3.8 FIELD QUALITY CONTROL

A. Arrange for roofing system manufacturer's technical personnel to inspect roofing installation upon completion.

B. Flood Test all roofing areas per City of San Diego 2016 New Construction Standards. Coordinate testing with Owner.

C. Repair or remove and replace components of roofing system that do not comply with specified requirements.

D. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.9 PROTECTION

A. Protect new roofing system from damage and wear during construction period. Inspect new roofing for damage if used during construction

END OF SECTION 07 54 19.11

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formed sheet metal fabrications.

B. Related Requirements:
   1. Section 06 10 00 “Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Section 07 13 26 “Self-Adhering Sheet Waterproofing” for waterproofing behind sheet metal flashings.
   3. Section 07 54 19.11 “Adhered Thermoplastic PVC Membrane Roofing” for materials and installation of sheet metal flashing and trim related to roofing and needed to form transitions with other assemblies.
   4. Section 07 41 14 “Standing Seam Metal Roof Panels” for coordination of gutters, downspouts, edge flashing and transitions between assemblies.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

   1. Include material descriptions of individual components and profiles and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

   1. Include CAD Drawn plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in Project.

4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of special conditions.
8. Include details of connections to adjoining work.
9. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches .

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 4 inch square demonstrating material and finish.

E. Mock-up
1. Provide mock-ups of sheet metal flashing and trim as requested by owner and architect. Content of mock-ups shall be decided by owner and architect.
2. Mock-ups may be installed as part of the final installation upon approval by owner, or in area designated for review of mock-ups by General Contractor.
3. Mock-ups shall demonstrate:
   a. Fasteners, cleats, clips, closures, and other attachments.
   b. Trim, Metal Closures, Expansion Joints, and Joint Intersections

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209 , alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. Shop Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, shop-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil .

2. Exposed Coil-Coated Finish:

a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Shop Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, shopy-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil .

4. Color: Color of sheet metal related to PVC Membrane roofing systems shall match Roofing Manufacturers clad sheet metal, unless noted otherwise on drawings. Color of sheet metal related to standing seam and corrugated roof system shall match AEP Span Rustic Color “Sedona Rust” as approved by Architect. Color of other miscellaneous flashings shall match color of adjoining surface and as determined by architect.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil .

C. Stainless-Steel Sheet: ASTM A 240/A 240M Type 316, dead soft, fully annealed; with smooth, flat surface.

1. Finish: #4 (polished directional satin).

D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat or mill phosphatized for field painting.
2. Exposed Coil-Coated Finish:
   a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Shop Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, shop-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil .
4. Color: Color of sheet metal related to PVC Membrane roofing systems shall match Roofing Manufacturers clad sheet metal, unless noted otherwise on drawings. Color of sheet metal related to standing seam and corrugated roof system shall match AEP Span Rustic Color “Sedona Rust” as approved by Architect. Color of other miscellaneous flashings shall match color of adjoining surface and as determined by architect.
6. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil .

2.3 UNDERLAYMENT MATERIALS: provide underlayment as indicated in Section 07 13 26 “Self Adhering Sheet Waterproofing, and compatible with sheet underlayment of adjoining assemblies, and as indicated in Section 07 41 14 “Standing Seam Metal Roof Panels”.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

J. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

K. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Gutter Profile: as indicated in drawings.
2. Expansion Joints: Butt type with cover plate.
3. Accessories: leaf screens over open gutters.
4. Gutters with Girth up to 15 Inches : Fabricate from the following materials:
    a. Aluminum: 0.032 inch thick.

B. Built-in Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate in minimum 96-inch-long sections. Fabricate expansion joints and accessories from same metal as gutters unless otherwise indicated.

1. Fabricate gutters with built-in expansion joints and gutter-end expansion joints at walls.
    a. Accessories: Leaf screens. Hinged design with stainless steel clips.
2. Fabricate from the Following Materials:
    a. Stainless steel mesh, or mesh material matching gutter materials providing strength and durability.

C. Downspouts: Fabricate round downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricated Hanger Style: Fig 1-35D according to SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from the following materials:
    a. Aluminum: 0.024 inch thick.

2.7 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
1. Aluminum: 0.032 inch thick.

B. Drip Edges: Fabricate from the following materials:
1. Aluminum: 0.032 inch thick.

C. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
   1. Aluminum: 0.032 inch thick.

D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
   1. Aluminum: 0.032 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
   1. Aluminum: 0.032 inch thick.
   2. Stainless Steel: 0.016 inch thick at all locations in contract with concrete and as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches .

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not

less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches . Roll laps and edges with roller. Cover underlayment within 14 days.

D. Apply slip sheet, wrinkle free, before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F , set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F .
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches ; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder aluminum sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

E. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

F. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

G. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches . Secure in waterproof manner by means of snap-in installation and sealant unless otherwise indicated.

H. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant approved by roofing manufacturer and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

C. Sills: Install sill flashings with up-turned edges to form pans on building side of flashings. Lap other flashing over sill flashing to form continuous waterproof system. Set sill flashings over self adhering membrane flashings lapped continuous behind flashings, or in continuous bed of sealant at all openings where membrane flashings cannot be lapped vertically behind sill. Avoid penetrating horizontal pan of sill. Seal all penetrations after installation and before covering with other work.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Latex Joint Sealants

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a testing agency.

B. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.

3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

C. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

D. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

E. Field-Adhesion-Test Reports: For each sealant application tested.

F. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with concrete substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, **not older than 24 months**, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Owner's Representative.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Owner's Representative seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

C. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS (for use with non-porous substrates)

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide the following:
   a. Dow Corning Corporation; Dow Corning® 795 Silicone Building Sealant.
   b. GE Construction Sealants; Momentive Performance Materials Inc; SCS2700 SilPruf LM.

2.3 NONSTAINING SILICONE JOINT SEALANTS (for use with porous substrates)

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; Dow Corning® 795 Silicone Building Sealant.
b. Sika Corporation; Joint Sealants; Sikasil WS-295.
c. Tremco Incorporated; Spectrem 2.

2.4 URETHANE JOINT SEALANTS (for use with concrete substrates)

A. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide the following:

a. Tremco Incorporated; Dymeric 240.
b. Sikaflex 2c-NS
c. Tremco Vulkem 922

B. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide the following:
a. Sikaflex 2c-SL
b. Tremco THC-901

2.5 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Subject to compliance with requirements, provide comparable products by one of the following:

a. BASF Building Systems.
b. Bostik, Inc.
c. May National Associates, Inc.
d. Pecora Corporation.
e. Schnee-Morehead, Inc.
f. Tremco Incorporated.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. BASF Corporation; Construction Systems; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
b. Construction Foam Products; a division of Nomaco, Inc.
c. Or equal

C. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.

    b. Wood

    c. Tile

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.

    b. Glass

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings and according to Figure 8B in ASTM C 1193.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
b. Perform one test for each 1000 feet joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

a. Whether sealants filled joint cavities and are free of voids.

b. Whether sealant dimensions and configurations comply with specified requirements.
c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Contractor to provide joint sealant schedule listing each application, adjoining substrates, proposed sealant and proposed color.

END OF SECTION 07 92 00

SECTION 08 11 13

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.

B. Related Requirements:
1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.
1. Steel Door Institute Publication SDI-100, Standard Steel Doors and Frames.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.

8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.

E. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Retain "Manufacturers" Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers. Verify specific capabilities with individual manufacturers.

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Republic Doors and Frames, JR Metal Frames, or Fleming Door Products.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Hollow-Metal Doors and Frames: NAAMM-HMMA 860. At locations indicated in the Drawings and Schedule.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches
    c. Face: Metallic-coated steel sheet, minimum thickness of 16 gage with minimum G90 coating, exterior, and 18gage with shop primed coating..
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Honeycomb core.
    f. Color: As indicated on drawings.

3. Frames:

    a. Materials: Metallic-coated steel sheet, minimum thickness of 14 ga. Exterior, with G90 coating, and 16 ga. Interior, with shop primed coating.
    b. Construction: Full profile welded.
    c. Color: Matching As indicated on drawings.

4. Exposed Finish: Primed and painted according to High performance Coatings Specifications 099600.

2.4 FRAME ANCHORS

A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

2. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Honeycomb Door Cores: Provide minimum 0.75 inch cell honeycomb with a U-factor of 0.59.
2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches .
4. Top Edge Closures: Close top edges of doors with flush closures, except provide flush closures at exterior doors of same material as face sheets.
5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
6. Provide 12-inch bottom rails for louvered doors.
7. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
8. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

b. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions, unless otherwise recommended by manufacturer..
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.7 STEEL FINISHES

A. Prime Finish: For field Painted Doors and Frames, Clean, pretreat, and apply primer in accordance with Specification Section 099600.

2.8 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled galvanized coated steel sheet set into 0.032-inch-thick steel frame. Exterior door louvers shall have stainless steel insect screens.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sound-Rated Construction: Coordinate with installation of acoustical insulation and sound-control doors prior to installing hollow metal frames.

B. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

   a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

   a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
   b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
   c. At Bottom of Door: 3/4 inch (19.1 mm)(15.8 mm)plus or minus 1/32 inch (0.8 mm).
   d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 11 13

SECTION 08 11 20

INTERIOR ALUMINUM DOORS, DOOR FRAMES, AND GLAZING FRAMES

PART 1 GENERAL

1.1 Summary

A. Section includes:
   1. Pre-finished aluminum door frames for interior use.
   2. Pre-finished aluminum window frames for interior use.
   3. Pre-finished aluminum framing systems for interior use.
   4. Pre-finished aluminum and glass doors for interior use.

B. Related sections:
   1. Section 08 14 16 – Flush Wood Doors.
   2. Section 08 41 13 – Aluminum Framed Entrances and Storefronts
   3. Section 08 44 13 – Aluminum Curtain Wall
   4. Section 08 71 00 – Door hardware.
   5. Section 08 80 00 – Glazing

1.2 Submittals

A. Submit under provisions of Section 01300.

B. Product data: Manufacturer's fabrication and installation instructions.
   1. Include information on factory finish, glazing gaskets, accessories and other required components.

C. Shop drawings: Submit schedule indicating opening numbers, frame types, dimensions, swings and hardware requirements.

D. Include elevations and details indicating frame types, profiles, conditions at openings, methods and locations of anchoring, glazing requirements, hardware locations and reinforcements for hardware.

E. Samples: Submit the following:
   1. Full range of manufacturer's standard finishes for the Architect's selection.
   2. Where normal color variations are expected, include additional samples to show range of such variation.

F. Instructions: Provide copies of manufacturer's data for fabrication and installation of aluminum door frames.

1.3 Quality Assurance

A. Single Source Responsibility: Provide aluminum frames, aluminum and glass doors and accessories produced by a single manufacturer for each type of product indicated.

1.4 Delivery, Storage and Handling

A. Deliver frames and doors cartoned to provide protection during transit and storage at project site.

B. Inspect frames and doors upon delivery for damage.
   1. Repair minor damage to pre-finished products by means as recommended by the manufacturer.
   2. Replace frames that cannot be satisfactorily repaired.

C. Store frames at the project site under cover and as near as possible to the final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.5 Environmental Requirements

A. Do not begin installation of the frames or doors until the area of work has been completely enclosed and the interior is protected from the elements.

B. Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy. If necessary, provide temperature control and ventilation to maintain required environmental conditions.

1.6 Warranty

A. Warrant against defects in manufacturing of materials for a period of 2 years from date of substantial completion.

B. Warrant framing finish against defects, including cracking, flaking, blistering, peeling and excessive fading, chalking and non-uniformity in color for a period of 5 years.

PART 2 PRODUCTS

2.1 Acceptable Manufacturers and Products

A. Basis of design Product: Subject to compliance with requirements, provide interior aluminum doors, door frames and glazing frames as manufactured by Wilson Partitions.
   1. Or Approved Equal meeting all requirements herein.

2.2 Materials

A. Aluminum: Controlled alloy billets meeting requirements of ASTM B221, 6063 T5 alloy, to assure compliance with tight dimensional tolerances and maintain color uniformity.

2.3 Extruded Aluminum Frames

A. Snap-On Trim Profile: Provide frames with the following characteristics:
   1. 4-7/8” throat.

2.4 Fabrication

A. Pre-machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within the frame.

B. Provide corner reinforcements and alignment clips for precise butt or mitered connections.
C. Fabricate all components to allow secure installation without exposed fasteners.
D. Manufacturer shall pre-cut and ship all frame materials knock-down.

2.5 Finishes
A. Factory finish extruded frame components so that any part exposed to view upon completion of installation will be uniform in finish and color.
B . Flurocryl Coating: Comply with AAMA (2603) 603.8 and AA-DAF-45.
1. Factory applied painted finish.
2. Color coat: Dry film thickness 0.8 +/- 0.05 mil.
3. Color: Custom As selected by Architect.

PART 3 EXECUTION

3.1 Examination
A. Examine project conditions and verify that the work of this section may properly commence. Do not proceed with the installation until unsatisfactory conditions have been corrected.
B. Verify that the wall thickness does not exceed manufacturer's recommended tolerances of specified frame throat size.

3.2 Installation
A. Comply with frame manufacturer's printed installation instructions and approved shop drawings. Strictly adhere to maintaining specified wall thickness to insure dimension does not exceed frame throat size specified. Installation not to be attempted in areas where the wall thickness exceeds the tolerance of the specified throat size.
B. Install frames plumb and square, securely anchored to substrates with fasteners recommended by frame manufacturer.
1. Use concealed installation clips to assure that splices and connections are tightly butted and properly aligned.
2. Secure clips to main structural extrusion components and not to snap-in or trim members.
3. Do not use screws or other fasteners that will be exposed to view when installation is complete.

3.3 Adjusting and Cleaning
A. Clean exposed frames promptly after installation, using cleaning methods recommended by frame manufacturer.
B. Touch up marred areas so that touch-up is not visible from a distance of 4 feet. Remove and replace frames that cannot be satisfactorily adjusted.

3.4 Protection

A. Provide protection required to assure that frames will be without damage or deterioration upon substantial completion of the project.

END OF SECTION 08 11 20

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Seven-ply flush wood veneer-faced doors and transom panels for transparent finish.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:
   1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at location designated by owner.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

   1. Door core materials and construction.
   2. Door edge construction
   3. Door face type and characteristics.
   4. Door louvers.
   5. Door trim for openings.
   6. Door frame construction.
   7. Factory-machining criteria.
   8. Factory-specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

   1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
   2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
   3. Details of frame for each frame type, including dimensions and profile.

4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.
10. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.
1. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

A. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during remainder of construction period.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors and frames that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors and frames.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flush wood doors and wood paneling from single manufacturer.

2.2 FLUSH WOOD DOORS AND FRAMES, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Provide labels and certificates from AWI or WI certification program indicating that doors and frames comply with requirements of grades specified.
a. Contractor shall register the Work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling 855-345-0991.

2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS AND TRANSOM PANELS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Marshfield DoorSystems; "Signature Series" or a comparable product by one of the following:

    a. Algoma Hardwoods.
    b. Eggers Industries.

2. Veneer Grade: AA.
3. Species: To be selected by Architect from one of the following: Aniegre, Select White Ash, Select White Birch, Select White Maple, or White Oak.
4. Cut: Rift cut.
5. Match between Veneer Leaves: Book match.
6. Assembly of Veneer Leaves on Door Faces: Center-balance match.
7. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions. Provide sets up to four doors.
8. Special Veneer Selection: Select veneers for similar color and grain.
9. Transom Match: Continuous match.
10. Exposed Vertical Edges: Veneer of same species as face, bonded to structural composite lumber, concealing edges for crossband.
11. Horizontal Edges: Structural composite lumber.
12. Core: Wood-based Particleboard, Structural composite lumber, fire-resistant composite, or specialty core as required per Article 2.2 and schedule.
13. Construction: Five plies. Stiles and rails are bonded to core, and then entire unit is abrasive planed before veneering.
14. WDMA I.S.1-A Performance Grade: As specified in Article 2.2.

2.4 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flat.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

C. Transom and Side Panels:

1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
3. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails.
4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:
   1. Finish: Architectural Woodwork Standards System-5, Varnish, Conversion.
   2. Staining: As selected by Architect from manufacturer's full range.
   3. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

   1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
   2. Anchor frames to anchors or blocking built in or directly attached to substrates.

      a. Secure with countersunk, concealed fasteners and blind nailing.
      b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

         1) For factory-finished items, use filler matching finish of items being installed.

D. Job-Fitted Doors:

   1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

      a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

   2. Machine doors for hardware.
   3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   4. Clearances:

      a. Provide 1/8 inch at heads, jambs, and between pairs of doors.

b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
c. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Provide inspection of installed Work through AWI's Quality Certification Program or WI's Certified Compliance Program, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMCA/WI's "Architectural Woodwork Standards" for the specified grade.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
3. Accessible Doors: Inspect that installed doors meet all applicable requirements of ADA.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 32 13

SLIDING ALUMINUM-FRAMED GLASS DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Multi-Slide Aluminum Glass Doors:
   1. Series 600: Non-thermally broken.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 92 00 - Joint Protection.

C. Section 08 71 00 – Door Hardware.

1.3 REFERENCES

A. Aluminum Anodizers Council (AAC):
   1. AAC Class 1 -Anodized Architectural Aluminum Coatings.

B. American Architectural Manufacturers Association (AAMA):
   1. AAMA 2604 - Voluntary Specifications, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   2. AAMA 2605 - Voluntary Specifications, Performance Requirements and Test Procedures for Pigmented for High Performance Organic Coatings on Aluminum Extrusions and Panels.

C. American National Standards Institute (ANSI):
   1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used In Buildings.

D. ASTM International (ASTM):
   1. ASTM E 283 - Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   2. ASTM E 330 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   3. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.

E. Consumer Product Safety Commission (CPSC):
   1. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.

F. National Fenestration Rating Council (NFRC):

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Include outside net frame dimensioning, number of panels, sliding configuration of panels left or right, typical head, side jamb, sill and panel details and type of glazing material per vertical plan and elevations view drawings.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (152 mm) square, representing actual product and color.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide complete, sliding door system by a single source manufacturer

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Remodel mock-up area as required to produce acceptable work.

C. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate conditions, construction documents, details and manufacturer's warranty requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged packaging with identification labels intact.

B. Storage and Protection: Protect stored product from damage. Store products in dry, well ventilated area out of direct sunlight, under cover, protected from weather, moisture and excessive dryness and construction activities.

1.7 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Western Window Systems, which is located at: 2200 E. Riverview Dr.; Phoenix, AZ 85034; Toll Free Tel: 877-268-1300; Fax: 602-243-3119 ; Email:request info (bleizerowicz@westernws.com); Web:https://www.wwscommercial.com

B. Or approved equal.

2.2 MULTI-SLIDE ALUMINUM DOORS

A. Basis of Design: Series 600: non-thermally broken aluminum multi-slide glass doors as manufactured by Western Window Systems.
   1. Multiple sliding door system with thermally efficient core including head, side jambs, thresholds and aluminum sliding panels to sizes indicated on the Drawings.
   2. Performance Requirements:
      a. Frame and Panel: Non-thermally broken.
      b. Certifications: AAMA and NFRC.
   3. Stacking Configuration: Sliding door system including head, side jambs, thresholds and aluminum sliding panels.
   4. Frame and Panels: Sizes indicated on the Drawings.
      a. Panel: non-thermally broken, extruded aluminum stile and rail panels with standard one lite.
         1) Stile and Rail: 2.55 inches (65 mm) interlock design.
         2) Thickness: 2.25 inches (57 mm).
         3) Overall Size: as shown on the drawings
      b. Frame and Sill: non-thermally broken extruded aluminum.
      c. Weatherstripping: Weather seal inserted in frame and sill to provide perimeter seal, as well as between door panels.
   5. Glass: All glass to comply with safety glazing requirements of ANSI Z97.1 and CPSC 16CFR 1201.
      a. Glazing: Clear Tempered Glazing Unit from Cardinal Glass Industries.
         1) Overall Thickness: Nominal 1 inch (24.5 mm).
   6. Multi-point concealed locking system securing large sliding panels with locking hardware located on the primary sliding panel.
   7. Fixed Single panel with connection to steel post as shown on the drawings.
   8. Locking Hardware and Handles: Manufacturer's premium one-piece handle. Handle height: as shown on the drawings.
      a. Keyed cylinder.
      b. Finish: brushed nickel.
   9. Rolling Hardware: Rollers integrated with head track, side jambs and threshold framing.
      a. Roller Size: 1.81 inch (46 mm) standard.
      b. Sills: Thinline sills.
   10. Aluminum Finish:
      a. Color to match Arcadia Inc. Standard Dark Bronze finish #AB-7.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine substrates and existing construction prior to installation. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Commencement of installation constitutes acceptance of conditions.

3.2 INSTALLATION

A. Install products in strict accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 35 00

ALUMINUM SIDE FOLDING DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum Folding Glass Doors.

1.2 RELATED SECTIONS

A. Section 061000 – "Rough Carpentry"
B. Section 079200 – "Joint Sealants"
C. Section 087100 - Door Hardware.

1.3 REFERENCES

A. AAMA 611.98 - Voluntary Specification for Anodized Architectural Aluminum.

B. AAMA 2603.02 - Voluntary Specifications, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

C. AAMA 2604 - Voluntary Specifications, Performance Requirements and Test Procedures for Pigmented for High Performance Organic Coatings on Aluminum Extrusions and Panels.

D. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used In Buildings.

E. ASTM E 283 - Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

F. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.

G. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Folding Door Systems to comply with the performance requirements specified with independently certified testing results.

B. Aluminum Folding Doors:
   1. Weather Resistant Sill Test Results:
      a. Air Infiltration: ASTM-E 283 when tested at 1.6 psf (25 mph), 0.10 CFM/FT2.
      b. Water Infiltration: ASTM-E 547 when tested at 5.25 PSF, No Leakage

c. Uniform Load Deflection at Design Pressure: ASTM-E 330 when tested at plus or minus 55.0 PSF, DP 55, 0.46 inches Positive and 0.49 inches Negative with no damage.
d. Uniform Load Overload at plus or minus 82.5 PSF, 0.02 positive, 0.01 negative permanent set with no damage.

2. Glazing Performance:
   a. As identified on the window schedule

1.5 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Include outside net frame dimensioning, direction of swing (outswing or inswing), number of panels, folding configuration of panels left or right, identify main entry swing panel, typical head, side jamb, sill and panel details and type of glazing material per vertical plan and elevations view drawings.

D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
   2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

H. Closeout Submittals: Provide manufacturer’s maintenance instructions that include recommendations for periodic checking and adjustment of cable tension and periodic cleaning and maintenance of all railing and infill components.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide complete, engineered and high quality folding door system by a single source manufacturer of folding door systems in the U.S.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect stored product from damage. Store products flat in dry, well ventilated area out of direct sunlight, under cover, protected from weather, moisture and excessive dryness and construction activities.

1.8 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Manufacture’s limited warranty including; 10 years for panel and frame aluminum components, product finishes, folding system hardware, and weather stripping; 5 years for locking hardware and screens; 10 years for insulated glass against failure of the air seal and that each unit will be free from material obstruction of vision as a result of fogging or film formation on the internal surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: LaCantina Doors, Inc., 1875 Ord Way, Oceanside, CA 92056. ASD. Telephone: (888) 221-0141. Fax: (760) 734-1591. Website: www.lacantinadoors.com. Email: info@lacantinadoors.com.

B. Or approved equal.

2.2 FOLDING GLASS DOORS

A. Aluminum Folding Doors.

1. Frame and Panels: Complete folding door system including head, side jambs, thresholds and aluminum panels to sizes indicated on the Drawings.
   a. Panel: Extruded aluminum stile and rail panels with standard one lite.
      1) Thickness 1-3/4 inches (44.5 mm).
      2) Stile and Rail 2-3/4 inches (70 mm).
      3) Bottom Rail 2-3/4 inches (70 mm).
      4) Bottom rail 10 inch (254 mm) ADA rail.
   b. Frame and Sill: Extruded aluminum.
      1) Jamb thickness: 1-1/4 inches (32 mm).
      2) Frame width: 5-5/8 inches (143 mm).
   c. Weatherstripping: Weather seal inserted in frame and sill to provide perimeter seal, as well as between door panels. Color is dark bronze.
2. Glass: All glass to comply with safety glazing requirements of ANSI Z97.1 and CPSC 16CFR 1201.
   a. Type:
      1) Insulated glass with a 1 inch (25.5 mm) overall thickness.
   b. Glass:
      1) Clear insulated.
      2) Tempered.
      3) Glazing Performance Ratings to match window type 1 per window schedule
   c. Glazing: Silicone bedding on exterior surfaces and glazing seal on the interior of the panel.
3. Locking Hardware and Handles: Manufacturer’s standard handle and concealed two point locking hardware operated by 90 degree turn of handle.
   a. On the main entry panel for configurations with a swing panel, provide manufacturer’s standard trimset and lever handles,a Schlage compatible lockset multi-point locking with dead bolt and concealed locking rods at the top and bottom of the door panel. Locking rods and mechanism shall not be edge or surface mounted. Depressing the handles withdraws the latch. Lifting the handles employs the rods and a turn of key or thumb turn employs the deadbolt and operates lock.
   b. Locking/handle operation from inside only (for even/even panel configurations or window applications where manufacturer’s standard lever handle and lockset is not provided), on all swing panels or pair of folding panels to be opened first, provide manufacturer's standard handle and concealed two point locking hardware operated by 90 degree turn of handle.
   c. Cap concealed aluminum locking rods with solid stainless steel tips that lock into the frame’s top and bottom locking channels.
   d. Handle Finish:
      1) Brushed Satin Aluminum color.
   e. Provide main entry panel handle height centered at 36 inches (914 mm) from bottom of panel.
   f. Provide Dorma Panic Door Hardware at the inside of main entry panels per folding door manufacturer’s recommendations.
   g. Provide Dorma Door Closer at the inside of main entry panels per folding door manufacturer’s recommendations.
4. Folding Hardware: Manufacturer’s standard folding hardware integrated with engineered head track, side jambs and threshold frame system. Systems where weight of panels is borne by the bottom of the track will not be allowed.

Hardware systems carrying capacity is a minimum of 220 lbs (99.79 Kg) per panel.

a. System operates with an upper wheel carrier that rolls on the aluminum head track. Lower track is incorporated into the threshold to guide door panels. Upper carrier and lower guide attached to door panel hinges. Jamb panels attached with top and bottom pivots. Panels connected with hinges including top and bottom hinges attached to top carrier and lower guide. Handles to open and close door is included. Carrier pins at top pivots, and intermediate and end carriers support the full door weight and provides panel adjustment. A pin locking system is used to lock vertical adjustment once heights are set. Pivots at jamb allow screwdriver adjustment of the system horizontally up to 3/8 inch (10 mm). All screws fully concealed for external security. Architectural grade stainless steel used for hinge pins, carrier pins and carrier bogeys.

b. Hardware Sets:
   1) Hinges: Provide 3 hinges on panels 96 inches (2438 mm) or less and 4 hinges on panels taller than 96 inches (2438 mm).
   2) Wall Pivots: Provide wall pivots for jamb side pivot panels for taller doors or high-wind environments.

c. Hardware finish:
   1) Brushed Satin Bronze color.

d. Threshold:
   1) ADA Compliant ramp sill.

e. Adjustment: System to be capable of adjustments without removing panels from tracks, up to 3/8 inch (7 mm) both vertically and horizontally with flathead and Phillip's head screwdriver.

f. Gaps between folding panels that accommodate weather stripping and hinges to be 3/16 inch (5 mm) or less when panels are closed.

5. Aluminum Finish: Provide same finishes on inside and outside.
   a. Color to match Arcadia Inc. standard dark bronze finish #AB-7
6. Threshold Finish:
   a. Clear anodized.
7. Door Stops: Provide magnetic door stops for main entry swing panels and for stacking of folding panels.

2.3 FABRICATION

A. Sizes and Configurations: Fabricate to sizes and configurations indicated on the Drawings. Verify opening sizes by field measurement prior to completing fabrication.

B. Verify swing/stacking direction for outswing or inswing opening units.

C. Coordinate all fabrication with electrified door hardware requirements as noted on the drawings and specification section

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that the maximum deflection of the header with the live load does not exceed the lesser of L/720 of the span and 1/4 inch. Structural support for lateral loads including both wind load and when the panels are stacked open) must be provided.

C. Verify that dimensions of rough opening will fit the net frame dimensions of door system; verify that rough openings are level, plumb, and square, with no unevenness in the floor.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Properly flash and waterproof around the perimeter of the opening and frame. Adequate overhangs to prevent the effects of sheeting water from above are recommended.

C. Provide adequate anchorage devices. Securely fit frame in place, level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work. Head section of frame must be installed with a 1/8 inch upward crown at the center of the opening.

D. If necessary, for tracks recessed into finish floors, drill weep holes in the floor track and provide drain connectors to ensure water can escape from the tracks.

E. Ensure doors are adjusted for proper operation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Protect installed product from construction activities, particularly thresholds and floor channels.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Storefront framing for punched openings.
3. Interior Storefront Framing
4. Exterior manual-swing entrance doors and door-frame units.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit MR 4: Complete the LEED Subcontractor Checklist form under 01 81 13 for products having recycled content. Include documentation indicating percentages by weight of post consumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

2. Product Data for Credit IEQ 4.1: Complete the LEED Subcontractor Checklist form under 01 81 13 for adhesives and sealants applied on-site.

a. Product data for adhesives and sealants applied inside the weatherproofing system indicating VOC content of each product used and the corresponding VOC maximum. Indicate the VOC content in g/L calculated according to 40 CFR 59, Subpart D. VOC levels must not exceed LEED requirements.

C. Shop Drawings: Include accurately scaled, CAD drawn plans, elevations, sections, full-size details, and attachments to other work.

1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

D. Samples: For each exposed finish required.

E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

B. Product test reports.

C. Field quality-control reports.

D. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

B. Title-24-2013: Submit NFRC test reports for Glazing and Frames showing compliance with Solar Heat Gain requirements, U-Values, and Visible Light Transmittance.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.

b. Noise or vibration created by wind and thermal and structural movements.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
d. Water penetration through fixed glazing and framing areas.
e. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.

D. Deflection of Framing Members: Per AAMA TIR-A11-04

1. Deflection Normal to Wall Plane: 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m)

2. First option in "Deflection Parallel to Glazing Plane" Subparagraph below is based on typical deflection criteria for glass. Second option is based on GANA's "Glazing Manual."
3. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

   a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. ft at a static-air-pressure differential of 6.24 lbf/sq. ft. (75 Pa).

2. Entrance Doors:

   a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. .
   b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. .

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft. (480 Pa).

H. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.29 as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.38 as determined according to NFRC 200.
3. Visible Light Transmittance: Fixed Glazing shall achieve a minimum 0.70 Visible Light Transmittance.
4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 25 as determined according to NFRC 500.

5. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

6. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

A. Basis-of-Design Product: Exterior Storefronts - Arcadia Inc, TC-470 (2-1/4" x 4-1/2") and TC-670 (2-1/4" x 6") Subject to compliance with requirements, provide storefront system as manufactured by Arcadia Inc.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally Broken.
2. Glazing System: Retained mechanically with gaskets on two sides and structural silicon on two sides.
3. Glazing Plane: Front.
4. Finish: High-performance organic finish.
5. Fabrication Method: Factory pre-assembled frames, field glazed.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 INTERIOR STOREFRONTS

A. Basis-of-Design Product: Interior Storefront - Arcadia Inc, AR450 (2” x 4-1/2”) Subject to compliance with requirements, provide storefront system as manufactured by Arcadia Inc.

1. Construction: Non-Thermally Broken.
2. Glazing System: Retained mechanically with gaskets on two sides and structural silicon on two sides.
3. Glazing Plane: Center.
4. Finish: High-performance organic finish.
5. Fabrication Method: Factory pre-assembled frames, field glazed.

B.

2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch-(3.2-mm) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: Wide stile; 5-inch (127-mm) nominal width.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide removable glazing stops on outside of door.

2.6 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in ‘Section 087100 "Door Hardware."’

B. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
3. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lb/f (133 N) to set the door in motion and not more than 15 lb/f (67 N) to open the door to its minimum required width.

C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

F. Manual Flush Bolts: BHMA A156.16, Grade 1.

G. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

H. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

I. Cylinders: As specified in Section 087100 "Door Hardware.

J. Operating Trim: BHMA A156.6.

K. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

L. Concealed Overhead Holders: BHMA A156.8, Grade 1.

M. Surface-Mounted Holders: BHMA A156.16, Grade 1.

N. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

O. Weather Stripping: Manufacturer's standard replaceable components.

P. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

Q. Silencers: BHMA A156.16, Grade 1.

R. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).

S. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

2.7 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

E. Sealants used inside the weatherproofing system shall comply LEED VOC requirements.

2.8 FABRICATION

A. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

B. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

1. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color.

2. Color: Custom, as selected by Architect.

PART 3 - EXECUTION

3.1 DELEGATED-DESIGN PROCESS

A. Delegated-Design Submittals shall be submitted to, and reviewed by project Architect and Structural Engineer as necessary to achieve a “No Exceptions Taken” submittal review. Curtain Wall shop drawings shall include engineering analysis data signed and sealed by the qualified professional engineer, licensed in California, responsible for their preparation.

B. Deferred Submittal Processing: After achieving a “no exceptions taken” review by project Architect and Structural Engineer, contractor shall be responsible for attaining deferred submittal approvals from the City of San Diego, including permit fees. Process will require contractor to have plans and calculations stamped and signed by qualified professional engineer, licensed in California, responsible for the preparation of deferred submittal documents.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible and per Section 08 7100.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 08 41 13

SECTION 08 44 13

ALUMINUM CURTAIN WALL

PART I GENERAL

1.1 Summary:

A. Section includes: Glazed aluminum curtain wall.

Related Sections:

A. Section 07 92 00 – Joint Sealants
B. Section 08 41 13- Aluminum framed entrances and storefront
C. Section 08 80 00 – Glazing

1.2 References

A. American Architectural Manufacturers Association (AAMA)
B. American Society for Testing and Materials (ASTM)
C. Aluminum Association (AA)

1.3 System Description:

A. General : In Addition to requirements shown or specified, comply with applicable provisions of AAMA Curtain Wall manual for design, materials, fabrication and installation of component parts.
B. Design Requirements: Arcadia T500 Series is a self-supporting curtain wall with pressure plate and covers attached to the tongue of back member.
C. Performance Requirements:
   1. Limit air leakage through assembly to .06 CFM/min/sq. ft. of wall area at 6.24 PSF as measured in accordance with ASTM E 283.
   2. Water Resistance: No water leakage, when measured in accordance with ASTM E 331 at a static test pressure of 15 psf.
   3. Dynamic Water Resistance: No water leakage, when measured in accordance with AAMA 501.1-94, with a dynamic test pressure of 15 psf.
   4. Uniform load deflection under the following wind pressure normal to the plane of the wall, shall not exceed L/240 of the clear span or ¾”, when tested in accordance with ASTM E 330. Unfactored design wind pressures are 24 psf (positive) in Zone 4 & 5, 23 psf (negative) in zone 4 and 42 psf (negative) in zone 5. Refer to structural drawings, sheet S100 for detailed wind loading requirements.
   5. Uniform load structural at a pressure 1.5 times the design wind pressure in accordance with ASTM E 330.
   6. System shall not deflect vertically due to its own weight more than 1/8” at the center point, or 1/16” at the center point of a horizontal member, once deadload points have been established.
   7. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees f.

8. Condensation resistance factor (CRF) in accordance with AAMA 1503.1-88 shall not be less than 55.
9. Thermal Transmittance (U-Value) in accordance with AAMA 1503.1-88 shall not be more than .65 BTU, hr/degree F/SF.
10. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway. Maximum inelastic interstory design drift is 4.8 inch at the first floor and 4 inches at the other floors. See structural drawings, Sheet S100 for detailed seismic drift requirements.
11. Sound transmission shall be in accordance with ASTM E 90.
12. National Fenestration Rating Council (NFRC) specific application evaluation.

1.4 Submittals:

A. General: Prepare, review, approve, and submit specified submittals in accordance with section 013300. Product data, shop drawing, samples, and similar submittals are defined in 013300.

A. Product Data: Submit product data for each type of product specified.

B. Shop Drawings: Subcontractor shall submit accurately scaled CAD drawn Plans, Sections, Elevations and Details defining the completed system, anchorage and connection details, interfaces with building construction, and general membrane seam arrangements.
   1. Shop Drawings must be stamped and signed by a Structural Engineered licensed in the State of California.
   2. Shop Drawings shall include calculations of all system structural components and clearly indicate all attachment loads applied to building structure; and must be stamped and signed by a Structural Engineered licensed in the State of California.

C. Samples: Submit verification samples for colors, textures.

D. Quality Assurance:
   1. Single Source responsibility: Obtain entrances, storefronts & curtain walls through one source from a single manufacturer.
   2. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
   3. Certificates: (Qualification Data): Submit product certificates signed by manufacturer, certifying materials comply with specified performance characteristics and physical requirements.

E. LEED Submittals
   1. Credit MR 4 Recycled Content: Product Data and certification letters indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

   2. Credit MR 5 Regional Materials: Product Data indicating material harvest/extraction and manufacture locations.

      a. Include statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.

b. Include statement indicating cost and distance from point of extraction, harvest, or recovery to Project for each raw material used in regionally manufactured materials.

Credit EQ 4.1 Low Emitting Materials, Adhesives & Sealants: Product Data for adhesives and sealants used on the interior of the building indicating VOC content of sSubpart D (EPA method 24).

1.5 Quality Assurance:

A. Qualifications:
   1. Manufacturer's Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application methods.
   2. Framing Systems and entrance doors shall be the product of a single manufacturer.

B. Regulatory Requirements: 2007 CBC

C. Certificates/Certification: Certify that systems meet or exceed performance specified in 1.3.

D. Field Samples: Provide full size mock-up.

E. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.6 Delivery, Storage, and Handling:

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.7 Project Conditions/Site Conditions:

A. Field Measurements: Verify actual measurements/openings be field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.8 Warranty:

A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
      e. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 10 years from date of Substantial Completion.

PART II PRODUCTS

2.1 Manufacturers:

A. Acceptable Manufacturers: Arcadia, Inc., 3225 East Washington Blvd., Vernon, CA. Telephone: 323.269.7300,
   1. Kawneer
   2. Or Approved Equal

B. Basis of Design: Acceptable Products: Arcadia, Inc. T-500 (OPG 3000) series pressure plate glazed system for 1" glass, or equivalent

2.2 Framing Materials and Accessories:

A. Framing members, transition members, mullions, adaptors and mounting: Extruded 6063-T5 aluminum alloy (ASTM B221- Alloy G.S. 10a T5).

B. Screws, fastening devices and internal components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM.A-1-64. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.

C. Glazing Gasket:
   1. Compression-type design, replaceable, molded or extruded santoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
   2. Shall be of type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.

D. See drawings for mullion cap profiles.

2.3 Finish

A. Finish all exposed areas of aluminum and components as indicated.
   1. Fluorocarbon Coating: AAMA 2605.2.
      a. Resin: 70% PVDF Kynar or Duranar.
      b. Substrate: cleaned and pretreated with chromium phosphate.
      c. Primer: Manufacturer's standard resin base compatible coating. Dry film thickness.
         (a) Extrusion: Minimum 0.20 mil.
      d. Color Coat: 70% PVDF, dry film thickness.
         (a) Extrusion: 1.0 mil.

e. Color: As indicated on drawings.
f. Acceptable Coatings Manufacturers:
   (a) PPG Industries, Inc.
   (b) Valspar Corporation
   (c) BASF

2.4 System Fabrication:

A. Provisions shall be made at all sealed horizontals to keep moisture accumulation to the exterior.
B. System shall provide for two-piece horizontal framing so that all fasteners at intersection of horizontal and vertical members will be concealed.
C. Fasteners shall be located as to ensure concealment from view in the final assembly. There shall be no exposed fasteners at perimeter sections.

PART III EXECUTION

3.1 DELEGATED-DESIGN PROCESS

A. Delegated-Design Submittals shall be submitted to, and reviewed by project Architect and Structural Engineer as necessary to achieve a "No Exceptions Taken" submittal review. Curtain Wall shop drawings shall include engineering analysis data signed and sealed by the qualified professional engineer, licensed in California, responsible for their preparation.

B. Deferred Submittal Processing: After achieving a "no exceptions taken" review by project Architect and Structural Engineer, contractor shall be responsible for attaining deferred submittal approvals from the City of San Diego, including permit fees. Process will require contractor to have plans and calculations stamped and signed by qualified professional engineer, licensed in California, responsible for the preparation of deferred submittal documents.

3.2 Acceptable Installers:

A. Installer shall be a company specializing in installation of Aluminum Glazing Systems.
B. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.3 Examinations:

A. Site Verification of Conditions: Verify Substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

3.4 Preparation:

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.5 Installation:

A. Install in strict accordance with approved shop drawings and manufacturers installation instructions.

3.6 Field Quality Control:

A. Test the storefront for water leaks in accordance with AAMA 501.2-94. Conduct the test in the presence of the general contractor. Correct deficiencies observed as a result of the test.

3.7 Cleaning

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Replace or repair damaged installed products. Clean Installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris

END OF SECTION 08 44 13

SECTION 08 62 00

UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fixed curb mount unit skylight with formed curb counterflashing for mounting on roof curbs, for flat, low-slope and steep-slope roofing applications.

1.2 RELATED REQUIREMENTS

A. Section 061000 " Rough Carpentry" for site-built wood roof curbs for unit skylights.

B. Division 075419.11 “PVC Roofing” for roof flashing and roofing terminations at unit skylight curbs.

1.3 REFERENCE STANDARDS

A. General: Applicable edition of references cited in this Section is current edition published on date of issue of Project specifications, unless otherwise required by building code in force.

B. ASTM International: www.astm.org:
1. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
2. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings
3. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
4. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
5. ASTM E 408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
6. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
7. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

C. Code of Federal Regulations:

1. 29 CFR 1910.23 (e) (8) - Occupational Safety and Health Standards for Walking-Working Surfaces to Guard Floor and Wall Openings and Holes

D. National Fenestration Rating Council: www.nfrccommunity.org:

1. NFRC 100 - Procedure for Determining Fenestration Product U-factors
2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

1.4 COORDINATION

A. Coordinate dimensions, locations, and details of framed skylight curbs with unit skylight curb flashings. Verify requirements for roofing system terminations.

B. Coordinate unit skylight interior termination locations with structural layout, ceiling grid layouts, and other ceiling-mounted items.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site prior to delivery of unit skylight and installation of roof deck.

1.6 ACTION SUBMITTALS

A. Product Data: For unit skylights. Include standard construction details, product performance characteristics, and material descriptions, dimensions of individual components and profiles, and finishes.

1. Include test reports of qualified independent testing agency or third party certificates verifying compliance with performance requirements.

B. LEED Submittals:

1. Credit MR 4 Recycled Content: Documentation indicating the following:

a. Percentages by weight of post-consumer and pre-consumer recycled content.
b. Total weight of products provided.
c. Include statement indicating costs for each product having recycled content.

C. Shop Drawings: For unit skylight work. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.

1.7 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship under normal use within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of metals, metal finishes, dome, and other materials beyond normal weathering.
b. Breakage of glazing.

2. Warranty Period:

a. Unit Skylight and Flashing Product Warranty: 10 years from date of purchase.
b. Unit Skylight and Flashing Installation “No Leak” Warranty: 10 years from date of purchase.
c. Hail Breakage Warranty for Skylight Glass: 10 years from the date of purchase on all insulated glass units using laminated glass.
d. Insulating Glass Seal Failure Warranty: 20 years from date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products of VELUX America Inc., Greenwood, SC 29648; www.VELUXusa.com; (800) 878-3589, specifications@veluxusa.com.

1. Or Approved Equal.

B. Substitutions: As permitted under Instructions to Bidders and Section 012500 "Substitution Procedures".

C. Source Limitations: Obtain unit skylights through single source from single manufacturer.

2.2 Fixed Curb Mounted (FCM) Unit Skylights

A. System Description: Fixed curb mounted unit skylight with a roll-formed aluminum frame counter-flashing joined by corner keys, an interior condensation drainage gasket, an insulated glass unit, structural sealant, mounting fasteners, flashing and accessories, as required to meet installation and performance requirements indicated. FCM skylights shall be suitable for installation on roof curbs ranging from 0 degrees up to 60 degrees from horizontal.

1. Basis of Design: VELUX America, Inc, Model FCM Fixed Curb Mount Skylight.

B. Aluminum Frame Counter-flashing: Maintenance-free, roll-formed aluminum, 15 gauge, 0.06 inch (1.5 mm) thick with neutral grey Kynar® 500 polyvinylidene fluoride resin finish. Counter-flashing frames joined with neutral grey corner keys constructed from injection molded Acrylonitrile Styrene Acrylate (ASA)-Luran.

1. Unit Sizes: 46” x 46”, and as indicated on drawings.

C. Condensation Drainage Gasket: Factory applied black thermoplastic rubber gasket mounted around the entire interior aluminum frame assembly providing a thermal break weather seal and drainage for interior condensation.

D. Insulated Glass Unit: Factory assembled with low emissivity exterior pane and clear interior pane separated by a stainless steel spacer sealing the space between panes with 95% argon gas.

1. Exterior Pane: 0.16 inch (4mm) thick tempered glass with Neat® exterior coating and interior surface coated with three layers of low emissivity silver (LoE^3) coatings.

2. Interior Pane:
   a. Laminated, Two clear 0.090 inch (2.3 mm) heat-strengthened panes with a 0.030 inch (0.76 mm) white polyvinyl butyral interlayer sandwiched together.

E. Structural Sealant: Factory applied silicone sealant, black color, bonding the glass pane to the aluminum frame and suitable for external exposure.

F. Mounting Fasteners: #8 x 1.75 inch (44 mm) stainless steel, black zinc coated, self-drilling screws provided with skylight. 14 field installed screws secures skylight to site built curb as indicated in manufacturer's installation instructions.

2.3 PERFORMANCE REQUIREMENTS

A. Unit Skylight Standard, FCM 4646 or smaller unit with tempered Lo-E 366 coated exterior glass pane and interior pane as follows:
AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS-11 or previous):

1. Performance Grade (Primary Designator):
   a. [Laminated with 0.030 inch (0.76 mm) Interlayer: "SKG-PG120 Size Tested 1308 x 1308 mm (51 x 51 in.)".]
   b. [Tempered: "SKG-PG100 Size Tested 1308 x 1308 mm (51 x 51 in.)".]
   c. [Laminated with 0.090 inch (2.3 mm) PVB Interlayer: "SKG-PG100 Size Tested 1308 x 1308 mm (51 x 51 in.)".]

2. Design Pressure (DP):
   a. [Laminated with 0.030 inch (0.76 mm) Interlayer: DP = +250/-120 psf (+11.9/-5.75 kPa)]
   b. [Tempered: DP = +100/-140 psf (+4.9/-6.7 kPa)]
   c. [Laminated with 0.090 inch (2.3 mm) PVB Interlayer: DP = +100/-80 psf (+4.9/-3.83 kPa)]

3. Water Test Pressure: 15 psf (0.72 kPa) with no leakage at 5 gallons per minute spray rate.
4. Air Leakage Rate: 0.030 cfm/ft^2 maximum.

B. Unit Skylight Standard, 2270 size and smaller unit with tempered Lo-E 366 coated exterior glass pane and laminated interior pane with 0.030 inch (0.76 mm) interlayer.
AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS-11 or previous):

1. Performance Grade (Primary Designator): "SKG-PG100 Size Tested 660 x 1854 mm (26 x 73 in.)".
2. Design Pressure (DP): +200/-100 psf (+9.58/-4.79 kPa).

3. Water Test Pressure: 15 psf (0.72 kPa) with no leakage at 5 gallons per minute spray rate.
4. Air Leakage Rate: 0.030 cfm/ft^2 maximum

C. Daylighting: Provide daylighting photometric performance comparable to basis of design product at layout indicated, based upon daylighting profile of March 21, 9:00 am local time, at Project location by simulation in accordance with IESNA guidelines.

D. Air Infiltration: Maximum air leakage through tested size of 0.030 cfm/sq. ft. (1.5 L/s/sq. m) of fixed area as determined according to ASTM E 283 at a static-air-pressure differential of 1.57 lbf/sq. ft. (75Pa.)

E. Water Penetration under Static Pressure: No evidence of water penetration through unit when tested according to ASTM E 331 at a static-air-pressure differential of 15 lbf/sq. ft. (720 Pa).

F. Windborne-Debris Resistance:
1. Wind Zone 3 or Less: Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed representative of those specified, according to ASTM E 1886 and ASTM E 1996. Missile Level C, Wind Zone 3 requirements, and +50/-50 psf cycle pressure minimum.

G. Fire Ratings for Roof Assemblies with Fire Classifications: Unit skylight tested in accordance with ASTM E 108 and listed as passing Burning Brand test with target classification of Class B.

H. Energy Performance ratings for any size fixed curb mounted unit skylight with tempered Lo-E 366 coated exterior glass pane and interior pane as follows:

1. Thermal Transmittance: NFRC 100 maximum U-factor:
a. White Laminated with 0.030 inch (0.76 mm) Interlayer: 0.48 Btu/hr*ft2*deg F (2.73 W/m2*deg C).

2. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC:
a. White Laminated with 0.030 inch (0.76 mm) Interlayer: 0.26

3. Visible Transmittance (Vt): NFRC 200 maximum Vt:
a. White Laminated with 0.030 inch (0.76 mm) Interlayer: 0.47

I. Fall Protection Standard Compliance: 29 CFR 1910.23: Passed for all laminated fixed curb mount unit skylights.

2.4 MATERIALS

A. Aluminum Sheet: Flat sheet complying with ASTM B 209/B 209M.

B. Joint Sealants: As specified in Section 079200 "Joint Sealants."

C. Mastic Sealants: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with unit skylight installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install unit skylights in accordance with manufacturer's written instructions and approved shop drawings. Coordinate installation of units with installation of substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that finished installation is weather tight.

1. Anchor unit skylights securely to supporting substrates.
2. Install unit skylights on curbs specified in another section with tops of curbs parallel to finished roof slope.

B. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.

C. For custom flashings, install unit skylight curb counter-flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage testing agency to perform tests and inspections.

1. Test for water leaks according to AAMA 501.2 after installation and curing of sealants but prior to installation of interior finishes.
2. Perform test for total area of each unit skylight.
   a. Coordinate Testing with Owner.

B. Work will be considered defective if it does not pass tests and inspections.

C. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Replace glazing that has been damaged during construction period.

C. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 08 62 00

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:

   a. Swinging doors.
   b. Sliding doors.
   c. Gates.

2. Electronic access control system components, including:

   a. Biometric access control reader.
   b. Electronic access control devices.

3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
4. Lead-lining door hardware items required for radiation protection at door openings.
5. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.

2. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
5. Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:

1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.

   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Quantity, type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.
   k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
      1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

   a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.

c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
   1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:

   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

3. Certificates of Compliance:

   a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
   b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
   c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.

4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Factory order acknowledgement numbers (for warranty and service)
   d. Name, address, and phone number of local representative for each manufacturer.
   e. Parts list for each product.
   f. Final approved hardware schedule, edited to reflect conditions as-installed.
   g. Final keying schedule
   h. Copies of floor plans with keying nomenclature

i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.

    a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
4. Capable of producing wiring diagrams.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.

G. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

    a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
    b. Preliminary key system schematic diagram.
    c. Requirements for key control system.
    d. Requirements for access control.
    e. Address for delivery of keys.

H. Pre-installation Conference

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.07 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.

a. Closers:
1) Mechanical: 30 years

b. Exit Devices:
1) Mechanical: 3 years.
2) Electrified: 1 year.

c. Locksets:
   1) Mechanical: 10 years.
   2) Electrified: 1 year.

d. Continuous Hinges: Lifetime warranty.
e. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.09 MAINTENANCE

A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

B. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

4. 2 inches or thicker doors:

   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
10. Provide mortar guard for each electrified hinge specified.
11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 CONTINUOUS HINGES

A. Aluminum Geared

1. Requirements:

a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
b. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
c. Install hinges with fasteners supplied by manufacturer.
d. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

a. Scheduled Manufacturer: Von Duprin EPT-10.

B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.

C. Locate electric power transfer per manufacturer’s template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and

strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3 hour fire doors.

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset. Provide proper latch throw for UL listing at pairs.

2.10 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Von Duprin 98/35A series.

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.

2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Top latch mounting: double or single tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
15. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

    a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage/Von Duprin PS900 series.

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:

    a. 12/24 VDC Output, field selectable.
    b. Class 2 Rated power limited output.
    c. Universal 120-240 VAC input.

d. Low voltage DC, regulated and filtered.
e. Polarized connector for distribution boards.
f. Fused primary input.
g. AC input and DC output monitoring circuit w/LED indicators.
h. Cover mounted AC Input indication.
i. Tested and certified to meet UL294.
j. NEMA 1 enclosure.
k. Hinged cover w/lock down screws.
l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: BEST

B. Requirements:

1. Provide permanent interchangeable cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Replaceable Construction Cores.

a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
1) 3 construction control keys
2) 12 construction change (day) keys.

b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Provide cylinders/cores keyed into Owner's existing factory registered keying system.

C. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

D. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:

    a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    b. Patent Protection: Keys and blanks protected by one or more utility patent(s)

4. Identification:

    a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication “Keying Systems and Nomenclature” for identification. Do not provide blind code marks with actual key cuts.
    b. Identification stamping provisions must be approved by the Architect and Owner.
    c. Stamp cylinders/cores and keys with Owner’s unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with “DO NOT DUPLICATE” along with the “PATENTED” or patent number to enforce the patent protection.
    d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.

    a. Change (Day) Keys: 3 per cylinder/core.
    b. Permanent Control Keys: 3.
    c. Master Keys: 6.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4040XP series.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 3/4 inch (19 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.

7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 DOOR TRIM

A. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.16 PROTECTION PLATES

A. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:

    a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
    c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.17 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson.

B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.18 DOOR STOPS AND HOLDERS

A. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.19 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:

   a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
   b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width

4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.20 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.21 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Continuous Hinges: BHMA 628 (US28)
4. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)
10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

I. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying section.
2. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.

5. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

M. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

P. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

S. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 FIELD QUALITY CONTROL

A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.

1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.04 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each

item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

HW SET: 01
Not Used

HW SET: 02
Not Used

HW SET: 03
DOOR #:
112A

Provide each SGL door(s) with the following:

4	EA	HINGE	TA3386 4.5 X 4.5 NRP		US32D	MCK
1	EA	POWER TRANSFER	EPT10	↯	689	VON
1	EA	EU MORTISE LOCKSET	45HW-7-DEU-15-J-RQE	↯	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
1	EA	SURFACE CLOSER	1461 SCUSH FC		689	LCN
1	EA	FLOOR STOP	1211		630	TRM
1	EA	DOOR SWEEP	345AV			PEM
1	EA	THRESHOLD	PER DETAIL		AL	PEM
1	EA	POWER SUPPLY	PS902 120/240 VAC COORDINATE W/ DIV. 28 ACCESS CONTROL - WORK OF DIVISION 28	↯		VON
			CREDENTIAL READER - WORK OF DIVISION 28	↯		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET: 04
DOOR #:

118	119A	123	124	125	126
127	128				

Provide each SGL door(s) with the following:

4	EA	HINGE	TA3786 4.5 X 4.5		US26D	MCK
1	EA	POWER TRANSFER	EPT10	✓	689	VON
1	EA	EU MORTISE LOCKSET	45HW-7-DEU-15-J-RQE	✓	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC		689	LCN
1	EA	FLOOR STOP	1211		630	TRM
1	EA	POWER SUPPLY	PS902 120/240 VAC COORDINATE W/ DIV. 28 ACCESS CONTROL - WORK OF DIVISION 28	✓		VON
			CREDENTIAL READER - WORK OF DIVISION 28	✓		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET: 05
DOOR #:
112B 119B

Provide each PR door(s) with the following:

8	EA	HINGE	TA3786 4.5 X 4.5		US26D	MCK
1	EA	POWER TRANSFER	EPT10	✓	689	VON
1	EA	FLUSH BOLT	3820x3810		630	TRM
1	EA	DUST PROOF STRIKE	3910/3910N		630	TRM
1	EA	EU MORTISE LOCKSET	45HW-7-DEU-15-J-RQE	✓	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
1	EA	COORDINATOR W/ FILLER BAR	3094		626	TRM
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	1461 FC ST-1974		689	LCN
2	EA	MOUNTING PLATE	1460-18		689	LCN
1	EA	POWER SUPPLY	PS902 120/240 VAC COORDINATE W/ DIV. 28 ACCESS CONTROL - WORK OF DIVISION 28	✓		VON
			CREDENTIAL READER - WORK OF DIVISION 28	✓		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET: 06
DOOR #:
114

Provide each SGL door(s) with the following:

3	EA	HINGE	TA3786 4.5 X 4.5	US26D	MCK
1	EA	OFFICE LOCK	9K3-7-AB-15-D-S3	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 07
DOOR#
101 122 130B 130C

Provide each FLD door(s) with the following:

1	EA	MORTISE CYLINDER	1E74 C181	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
			ACCESS CONTROL - WORK OF DIVISION 28		
			CREDENTIAL READER - WORK OF DIVISION 28	✓	B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28		

BALANCE OF HARDWARE BY DOOR MFG.

HW SET: 08
Not Used

HW SET: 09
DOOR #:
130A

Provide each FLD door(s) with the following:

1	EA	MORTISE CYLINDER	1E74 C181	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES

BALANCE OF HARDWARE BY DOOR MFG.

HW SET: 10
DOOR #:
102

Provide each PR door(s) with the following:

8	EA	HINGE	TA2714 4.5 X 4.5 NRP	US26D	MCK
1	EA	FLUSH BOLT	3820x3810	630	TRM
1	EA	DUST PROOF STRIKE	3910/3910N	630	TRM
1	EA	CLASSROOM LOCK	9K3-7-R-15-D-S3	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	COORDINATOR W/ FILLER BAR	3094	626	TRM
2	EA	MOUNTING BRACKET	3095/3096	626	TRM
1	EA	SURFACE CLOSER	1461 HW/PA FC	689	LCN
1	EA	SURFACE CLOSER	1461 SHCUSH FC	689	LCN
2	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 11
DOOR #:
103 113

Provide each SGL door(s) with the following:

3	EA	HINGE	TA2714 4.5 X 4.5	US26D	MCK
1	EA	CLASSROOM LOCK	9K3-7-R-15-D-S3	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 12
DOOR #:
109B

Provide each SGL door(s) with the following:

4	EA	HINGE	TA2714 4.5 X 4.5	US26D	MCK
1	EA	STOREROOM LOCK	9K3-7-D-15-D-S3	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 13
DOOR #:
104

Provide each PR door(s) with the following:

2	EA	CONTINUOUS HINGE	CFM_HD1 EPT		628	PEM
2	EA	POWER TRANSFER	EPT10	↙	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-AX-9850WDC-EO-F-LBL-SNB	↙	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-AX-9850WDC-L-NL-06-LBL-SNB 24 VDC	↙	630	VON
1	EA	RIM CYLINDER	12E72-S2-RP		626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	KICK PLATE	K0050 10" X 2" LDW		630	TRM
2	EA	FLOOR STOP	1211		630	TRM
1	EA	POWER SUPPLY	PS904 900-2RS 900-BBK 120/240 VAC	↙		VON
			ACCESS CONTROL - WORK OF DIVISION 28			
			CREDENTIAL READER - WORK OF DIVISION 28	↙		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET: 14
DOOR #:
105 115A 115B 116 121

Provide each SGL door(s) with the following:

3	EA	HINGE	TA2714 4.5 X 4.5	US26D	MCK
1	EA	PRIVACY SET	9K3-0-L-15-D-S3	626	BES
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 15
DOOR #:
103A 117 120

Provide each SGL door(s) with the following:

4	EA	HINGE	TA2714 4.5 X 4.5		US26D	MCK
1	EA	POWER TRANSFER	EPT10	↯	689	VON
1	EA	EU LOCKSET	9KW-7-DEU-15-D-S3-RQE	↯	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC		689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW		630	TRM
1	EA	FLOOR STOP	1211		630	TRM
1	EA	POWER SUPPLY	PS902 120/240 VAC COORDINATE W/ DIV. 28 ACCESS CONTROL - WORK OF DIVISION 28	↯		VON
			CREDENTIAL READER - WORK OF DIVISION 28	↯		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET: 16
DOOR #:
110 111

Provide each SGL door(s) with the following:

3	EA	HINGE	TA2714 4.5 X 4.5	US26D	MCK
1	EA	PUSH PLATE	1001-3	630	TRM
1	EA	DOOR PULL	1018-3B	630	TRM
1	EA	SURFACE CLOSER	1461 REG OR PA AS REQ FC	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	630	TRM
1			SEALS BY DOOR/FRAME SUPPLIER		

HW SET: 17
DOOR #:
106

Provide each PR door(s) with the following:

6	EA	HINGE	TA2314 4.5 X 4.5 NRP	US32D	MCK
1	EA	PANIC HARDWARE	AX-9849-EO-LBL	630	VON
1	EA	PANIC HARDWARE	AX-9849-L-NL-06-LBL	630	VON
1	EA	RIM CYLINDER	12E72-S2-RP	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
2	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	GASKETING	303AS	AL	PEM
2	EA	DOOR SWEEP	345AV		PEM
1	EA	THRESHOLD	PER DETAIL	AL	PEM

HW SET: 18
DOOR #:
107

Provide each PR door(s) with the following:

6	EA	HINGE	TA2314 4.5 X 4.5 NRP	US32D	MCK
1	EA	FLUSH BOLT	3820x3810	630	TRM
1	EA	DUST PROOF STRIKE	3910/3910N	630	TRM
1	EA	MORTISE LOCK	45H-7-D-15-J	630	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	COORDINATOR W/ FILLER BAR	3094	626	TRM
2	EA	MOUNTING BRACKET	3095/3096	626	TRM
2	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	GASKETING	303AS	AL	PEM
1	EA	ASTRAGAL	357SP	600	PEM
2	EA	DOOR SWEEP	345AV		PEM
1	EA	THRESHOLD	PER DETAIL	AL	PEM

HW SET: 19
DOOR #:
108A

Provide each SGL door(s) with the following:

3	EA	HINGE	TA2314 4.5 X 4.5 NRP	US32D	MCK
1	EA	MORTISE LOCK	45H-7-D-15-J	630	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES
1	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	GASKETING	303AS	AL	PEM
1	EA	DOOR SWEEP	345AV		PEM
1	EA	THRESHOLD	PER DETAIL	AL	PEM

HW SET: 20
DOOR #:
G1 G2

Provide each PR door(s) with the following:

2	EA	GATE CLOSER	MAMMOTH-180-ZILV		LOX
2	EA	PANIC HARDWARE	CD-9847-L-NL-06SS-WH	630	VON
2	EA	RIM CYLINDER	12E72-S2-RP	626	BES
2	EA	MORTISE CYLINDER	1E74 C4	626	BES
4	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES

BALANCE OF HARDWARE BY GATE FABRICATOR.
CONFIRM HARDWARE WITH GATE FABRICATOR PRIOR TO ORDERING.

HW SET: 21
Not Used

HW SET: 22
DOOR #:
G5 G6 G7 G8

Provide each SGL door(s) with the following:

1	EA	GATE CLOSER	MAMMOTH-180-ZILV		LOX
1	EA	PANIC HARDWARE	CD-AX-98-L-NL-06-WH	630	VON
1	EA	RIM CYLINDER	12E72-S2-RP	626	BES
1	EA	MORTISE CYLINDER	1E74 C4	626	BES
2	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING	626	BES

BALANCE OF HARDWARE BY GATE FABRICATOR.
CONFIRM HARDWARE WITH GATE FABRICATOR PRIOR TO ORDERING.

HW SET:23
DOOR #:
100A 100B

Provide each PR door(s) with the following:

2	EA	CONTINUOUS HINGE	CFM_HD1 EPT		628	PEM
2	EA	POWER TRANSFER	EPT10	✓	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-AX-3549A-EO-LBL 24 VDC	✓	626	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-AX-3549A-T-360T-LBL 24 VDC	✓	626	VON
1	EA	MORTISE CYLINDER	1E74 C4		626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
2	EA	DOOR PULL	AP220E-12		630	TRM
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	AUTO OPERATOR	MAGIC FORCE (1 DOOR LEAF) W/ 2 FULL HT ACTUATORS	✓		STA
2	EA	DOOR SWEEP	345AV			PEM
1	EA	THRESHOLD	PER DETAIL		AL	PEM
1	EA	POWER SUPPLY	PS904 900-2RS 900-4RL 900-BBK 120/240 VAC	✓		VON
			ACCESS CONTROL - WORK OF DIVISION 28			
			CREDENTIAL READER - WORK OF DIVISION 28	✓		B/O
			DOOR CONTACT(S) - WORK OF DIVISION 28			
1			SEALS BY DOOR/FRAME SUPPLIER			

OPENING 100A REQUIRES ONE BOLLARD MOUNT AND ONE WALL MOUNT ACTUATORS.

OPENING 100B REQUIRES TWO BOLLARD MOUNT ACTUATORS.

HW SET:24
DOOR #:
109A

Provide each PR door(s) with the following:

1	EA	CONTINUOUS HINGE	CFM_HD1 EPT		628	PEM
1	EA	CONTINUOUS HINGE	CFM_HD1		628	PEM
1	EA	POWER TRANSFER	EPT10	✓	689	VON
1	EA	FLUSH BOLT	3820x3810		630	TRM
1	EA	DUST PROOF STRIKE	3910/3910N		630	TRM
1	EA	EU MORTISE LOCKSET	45HW-7-DEU-15-J-RQE	✓	626	BES
1	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING		626	BES
1	EA	COORDINATOR W/ FILLER BAR	3094		626	TRM
2	EA	OH STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
2	EA	FLUSH CEILNG MTG PLT	4040XP-18G		689	LCN
1	EA	ASTRAGAL	357SP		600	PEM
2	EA	DOOR SWEEP	345AV			PEM
1	EA	THRESHOLD	PER DETAIL		AL	PEM
1	EA	POWER SUPPLY	PS902 120/240 VAC COORDINATE W/ DIV. 28 ACCESS CONTROL - WORK OF DIVISION 28	✓		VON
			CREDENTIAL READER - WORK OF DIVISION 28 DOOR CONTACT(S) - WORK OF DIVISION 28	✓		B/O
1			SEALS BY DOOR/FRAME SUPPLIER			

HW SET:25
NOT USED

HW SET:26
NOT USED

HW SET:27
DOOR #:
G3 G4

Provide each SGL door(s) with the following:

1	EA	GATE CLOSER	MAMMOTH-180-ZILV		LOX
1	EA	PANIC HARDWARE	CD-AX-98-L-NL-06-WH	630	VON
1	EA	RIM CYLINDER	12E72-S2-RP	626	BES
1	EA	MORTISE CYLINDER	1E74 C4	626	BES
2	EA	COMBINATED CORE	1CDM-7 CONFIRM FINAL CYL. REQ. PRIOR TO ORDERING LOCAL ALARM - WORK OF DIV. 28	626	BES

BALANCE OF HARDWARE BY GATE FABRICATOR.
CONFIRM HARDWARE WITH GATE FABRICATOR PRIOR TO ORDERING.

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.

2. Doors.

3. Glazed curtain walls.

4. Glazed entrances.

5. Interior borrowed lites.

6. Storefront framing.

B. Related Sections include the following:

1. Division 8 Section "Aluminum-Framed Entrances and Storefronts."

2. Division 8 Section "Aluminum Curtain Wall."

1.2 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.

1) Basic Wind Speed: 110 mph.

2) Importance Factor: 1.0.

3) Exposure Category: B.

e. Deflection requirements in first subparagraph below are examples only and apply only to glass supported on all four edges. Revise to suit Project. See Evaluations.

f. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.

1) For monolithic-glass lites heat treated to resist wind loads.

2) For Laminated glass.

2) For insulating glass.

g. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

h. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 1/4 inch thick.

2. For insulating-glass units, properties are based on units with lites 1/4 inch thick and a nominal ½ inch wide interspace.

3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:

a. U-Factors: NFRC 100 expressed as Btu/sq. ft. x h x deg. F.

b. Solar Heat Gain Coefficient: NFRC 200.

c. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

A. Product Data:

1. For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12 inch square duplicate Samples for glass and sealant. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

C. Samples: For the following products, in the form of 12 inch square Samples for glass graded and labeled per Federal specification DD-G-451C.

1. Each type of monolithic glass.

2. Insulating glass for each designation indicated.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

F. Product Test Reports: For each of the following types of glazing products:

1. Coated float glass.

2. Insulating glass.

3. Laminated Glass

4. Glazing sealants.

5. Glazing gaskets.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.

B. Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

D. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of manufacturer acceptable to authorities having jurisdiction.

2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Quality Control."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg. F.

1.8 WARRANTY

A. Special Warranty for Coated-Glass Products: University's standard form, made out to University and signed by contractor agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years.

B. Special Warranty on Insulating Glass: General Contractor's standard form, made out to Owner and signed by contractor agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

3. Glazing sealants used inside the weatherproofing system, shall have a VOC content of not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

2. For uncoated glass, comply with requirements for Condition A.

3. For coated vision glass, comply with requirements for Condition C (other uncoated glass).

4. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

B. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture; and, complying with other requirements specified.

C. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer, ionomeric polymer interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with the following to comply with interlayer manufacturer's written instructions:

1. Polyvinyl butyral interlayer.
2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
3. Ionomeric polymer interlayer.
4. Cast-in-place and cured-transparent-resin interlayer.
5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

C. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.

2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

3. Sealing System: Dual seal, with primary and secondary sealants as follows:

a. Manufacturer's standard sealants.

4. Spacer Specifications: Manufacturer's standard spacer material and construction.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.

2. EPDM, ASTM C 864.

3. Silicone, ASTM C 1115.

4. Thermoplastic polyolefin rubber, ASTM C 1115.

5. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.

2. EPDM.

3. Silicone.

4. Thermoplastic polyolefin rubber.

5. Any material indicated above.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.

2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

2.7 MONOLITHIC FLOAT-GLASS UNITS

A. Uncoated Clear Float-Glass Units: Class 1 (clear) Kind FT (fully tempered) float glass.

1. Thickness: 1/4 inch.

2.8 INSULATING-GLASS UNITS

A. Low-E Insulating-Glass Units:

1. Basis-of-Design Product: PPG 70XL or equal.

2. Overall Unit Thickness and Thickness of Each Lite: 1 inch.

3. Interspace Content: Air.

4. Outdoor Lite: Class 1 (clear) float glass. Kind FT (fully tempered).

5. Indoor Lite: Class 1 (clear) float glass. Kind FT (fully tempered).

6. Low-E Coating: Pyrolytic on second surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep system.

3. Minimum required face or edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A.. Perform glazing in strict accordance with "Glazing Manual" as published by the Flat Glass Marketing Association.

B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

E. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

F. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

G. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

H. Provide spacers for glass lites where length plus width is larger than (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

I. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

J. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

K.. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

C. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

D. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

E. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.8 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

PART 4 GLAZING SCHEDULE

4.1 SCHEDULE OF GLAZING TYPES:

GL-1 Insulated Unit Glass for Exterior Glazing
1 inch thick unit consisting of ¼” tempered low iron exterior lite with Low-E Solarban 70XL coating on the #2 face, ½” sealed air space, and ¼” tempered interior lite.

GL-2 Tempered Monolithic Glass for Interior Glazing
3/8 inch thick tempered low-iron glass

GL-3 Tempered Monolithic Glass for Interior Glazing
1/4 inch thick tempered low-iron glass

GL-4 Tempered Monolithic Glass for Interior Glazing
1/4 inch thick laminated glass, with obscured color inner layer.
Inner layer to be selected by architect.

GL-5 Insulated Unit Laminated Glass for Exterior Skylight Glazing
As described in Specification 08 62 00 Unit Skylights

GL-6 Insulated Unit Glass for Exterior Glazing
1" thick unit consisting of ¼" tempered low iron exterior lite with Low-E Solarban 70XL coating on the #2 face, ½" sealed air space, and ¼" tempered interior light with acid etch surface on face #3

END OF SECTION 08 80 00

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following types of silvered flat glass mirrors:
   1. Laminated glass mirrors qualifying as safety glazing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Cad Drawn, accurately scaled drawings that include mirror elevations, edge details, mirror hardware, and attachment details.

C. Samples: For each type of the following:

   1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
   2. Mirror Clips: Full size.
   3. Mirror Trim: 4 inches long.

1.3 INFORMATIONAL SUBMITTALS

A. Preconstruction test report.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to

manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Mirrors, General: ASTM C1503; manufactured using copper-free, low-lead mirror coating process.

B. Laminated Mirrors: ASTM C1172, Type II.

1. Glass for Outer Lite: Annealed float glass, Mirror Select Quality, ultraclear (low-iron) float glass with a minimum 91 percent visible light transmission.
2. Nominal Thickness for Outer Lite: 1/8 inch.
3. Glass for Inner Lite: Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).
4. Nominal Thickness: 1/8 inch.
5. Interlayer: 0.030-inch- thick, clear polyvinyl-butyral.

C. Safety Glazing Products: For laminated mirrors, provide products that comply with 16 CFR 1201, Category II.

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating approved by mirror manufacturer.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors.

D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.

B. Mirror edge trim to be used when edge of mirror is left exposed on wall surface. Mirror edges that resolve into adjoining wall or finish surfaces do not require trim.

1. Bottom and Side Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.

2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.

3. Finish: Clear bright anodized.

C. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.4 FABRICATION

A. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

B. Mirror Edge Treatment: Flat Polished. Seal edges of mirrors with edge sealer.

C. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.

C. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 08 83 00

SECTION 08 91 19

FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

D. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include accurately scaled, CAD drawn plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified

testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Windborne-debris-impact-resistance test reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F , ambient; 180 deg F , material surfaces.

B. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Continuous Line, Drainable-Blade Louver:

1. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:
    1. Basis-of-Design Product: Subject to compliance with requirements, provide CS Specialties GS407, Drainable Louver with Fixed blades, heads, sills, jambs and mullions to be one-piece structural members formed from galvanized steel. Mullions and jambs to have integral internal drains. Blades to have gutters designed to catch and direct water to jamb and mullion drains. Blades shall be fastened to each jambs and mullions with two fillet welds with minimum 0.125” (8.18mm) throat. Frames shall

be joined at each corner with a full width fillet weld. Material thickness to be as follows: Heads, sills, jambs, mullions and fixed blades: Pick one of the following: 0.16 gauge (1.52mm), 18 gauge (1.21mm), or 20 gauge (0.91mm)

2. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with stainless-steel machine screws with heads finished to match louver, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Non-rewirable, U-shaped frames.

D. Louver Screening for Aluminum Louvers:
1. Insect Screening: Stainless steel, 18-by-18 mesh, 0.009-inch wire.

2.5 BLANK-OFF PANELS

A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

1. Aluminum sheet for aluminum louvers, not less than 0.050-inch nominal thickness.
2. Panel Finish: Same finish applied to louvers.
3. Attach blank-off panels with clips.

2.6 MATERIALS

A. Aluminum Extrusions: ASTM B 221 , Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 , Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.
1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
2. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.
2. Semirecessed Mullions: Where indicated, provide mullions partly recessed behind louver blades so louver blades appear continuous. Where length of louver exceeds fabrication and handling limitations, fabricate with interlocking split mullions and close-fitting blade splices designed to permit expansion and contraction.
3. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

G. Provide subsills made of same material as louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Custom Color as selected by Architect, Semi-gloss finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and field verify opening sizes and shapes, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by University's Representative, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 19

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product including manufacturers' limiting height tables indicating products provided

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: Provide documentation that framing members' meet CBC 2019 (IBC 2018) tolerance requirements and 3rd party inspection requirements. Certification by the Steel Framing Industry Association(SFIA) program, "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members" , meets these requirements

B. Evaluation reports for steel studs and tracks firestop tracks, post-installed anchors, and power-actuated fasteners.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified by 3rd party testing program. Certification by the Steel Framing Industry Association(SFIA) program, "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members" , meets these requirements

B. Handling and Storage: Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

C.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with AISI S220 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated. Galvannealed products are not acceptable.

B. Studs and Tracks:AISI S220. Use conventional steel studs and tracks.
1. Minimum Base-Steel Thickness: As required by performance requirements for horizontal deflection. Not less than 30 mil, (.0296 inch)
2. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: As required, provide one of the following:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement. If used within fire rated assembly, contractor to verify fire rated assembly is not adversely affected.
2. .
3. Slotted Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs. Contractor to verify that track being installed can be utilized in fire rated assembly specified and installed.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: 18 gauge.

F. Cold-Rolled Channel Bridging: Galvanized Steel, 16 gauge minimum base-steel thickness, with minimum 1/2-inch- wide flanges.
1. Depth:1-1/2 inches.

2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 16 gauge, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels:AISI S220.
1. Minimum Base-Steel Thickness: 18 gauge.
2. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
1. Configuration: Asymmetrical
2. .

I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4inch, minimum uncoated-steel thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES as appropriate for the substrate.

a. Uses: Securing hangers to structure.
b. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor or adhesive anchor.
c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length required.

E. Carrying Channels (Main Runners): Galvanized Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.

1. Depth: As required.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks:AISI S220. Use conventional steel studs and tracks.

a. Minimum Base-Steel Thickness: 30 mil (.0296 inch)
b. Depth: As indicated on Drawings and as required.

3. Hat-Shaped, Rigid Furring Channels:AISI S220, 7/8 inch deep.

    a. Minimum Base-Steel Thickness: 18 gage min.

4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.

    a. Configuration: Asymmetrical.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Securely fastenvertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c. and as required.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support or steel studs.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco).
2. Exterior horizontal and nonvertical plasterwork (stucco).

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: CAD Drawn, accurately scaled plans, elevations and details showing locations and installation of control and expansion joints, casing beads, and other accessories associated with the plaster work, and flashing and copings, including plans, elevations, sections, details of components, and attachments to and integration with other work.

C. Samples:
1. Submit 12” x 12” control samples of finish and color for architects review prior to creating mock-up. Submit a range of sample finishes as need for approval.
2. Finish shall match predominate finish technique utilized on the PHR Village Center Commercial Complex.
3. Submit complete range of Trim Accessory colors and profiles for selection by architect. Samples to be 4” in length. Profiles should include all conditions to be applied to project as described in shop drawings.

D. Mock-up
1. Provide an L-Shaped 6’ high x 8’ long wall surface demonstrating 4’ width of assembled substrate, weather barrier, drainage mat and lath and edges screeds. The remaining 4’ width of wall (at right angle to the the other 4’ section) will be used to demonstrate wall finish and color, and shall include one (1) control joint, one (1) movement joint, a bottom screed, a J-metal edge screed and a corner condition lapped at least 2’ around corner. Major portion of wall mock-up shall face East and shall be in an area that is not affected by shadows from adjoining structures or elements.
2. Mock-up shall <u>not</u> be a permanent part of the building. Mock-up shall remain in place at the construction site until actual building plaster has been installed as a basis of comparison. After review of installed building plaster against approved mock-up, contractor shall be responsible for removing and disposing of mock-up in accordance with documents.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.4 FIELD CONDITIONS

A. Comply with ASTM C926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 degrees F., or, if temperature is above 90 deg. F., without taking special precautions to avoid rapid drying which could cause cracking, flaking or separation of materials from substrate.

C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

A. Expanded-Metal Lath: ASTM C847, cold-rolled carbon-steel sheet with ASTM A653/A653M, G60, hot-dip galvanized-zinc coating, as manufactured by ClarkDietrich Building Systems or approved equal.
1. Diamond-Mesh Lath: Self-furring, 3.4 lb/sq. yd.
2. Flat-Rib Lath: Rib depth of not more than 1/8 inch (3 mm), 3.4 lb/sq. yd. 3/8-inch (10-mm) rib lath is often used where its rigidity is necessary for long spans.
3. 3/8-Inch (10-mm) Rib Lath: 3.4 lb/sq. yd.

B. Paper Backing: Provide two layers of FS UU-B-790a, Type I, Grade D (60 min.), Style 2 vapor-permeable paper.

2.2 ACCESSORIES

A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Vinyl Accessories: Manufactured from high-impact PVC, as manufactured by AMICO, Vinyl Corp or approved equal.
1. Product Description: Extruded vinyl components including corner & casing beads, control and expansion joints, weep screeds and screeds.
2. Composition: All vinyl compounds shall meet ASTM D-4216 for exterior vinyl components.

3. Product Standards: All vinyl components shall conform to ASTM D-4216 and C-1063 for exterior products.
4. Finish: Vinyl color laminate color applied to exposed areas of components. Fuse weld color during extrusion process, allowing entire PVC part to conform with ASTM D-4216 & C-1063. Color to be selected by architect from manufacturers full range of standard colors-white, brown, gray and tan (minimum).

2.3 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers,1 / 2 " (13mm) long, free of contaminants, manufactured for use in portland cement plaster.

C. Bonding Compound: ASTM C 932

D. Steel Drill Screws: for metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration though joined materials of no fewer that three exposed threads.

E. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.

F. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.

2.4 PLASTER MATERIALS

A. Portland Cement: ASTM C 150, Type II
1. Integral Color for Finish Coats:
a. Color: White

B. Plastic Cement: ASTM C 1328

C. Lime: ASTM C 206, Type S; or ASTM C207, Type S

D. Sand Aggregate: ASTM C897

E. Perlite Aggregate: ASTM C35

F. Scratch and Brown Coat:

2.5 PLASTER MIXES

A. General: Comply with ASTM C926 for applications indicated.
1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least tow minutes. Comply with fire manufacturer's written instruction for fiber quantities in mixes but do not exceed 1 lb. of fiber/cu. Yd. (0.6 kg of fiber/cu. M) of cementitious materials.

B. Base-Coat Mixes for Use over Glass reinforced Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:

   a. Scratch Coat: For cementitious material, mix 1-part portland cement and ½ to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
   b. Brown Coat: For cementitious material, mix 1-part portland cement and 3/4 to 1-1/2 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

2. Plastic Cement Mixes:

   a. Scratch Coat: 1 part plastic cement and 2-1/2 to 4 parts aggregate.
   b. Brown Coat: 1 part plastic cement and 3 to 5 parts aggregate, but not less than volume of aggregate used in scratch coat.

3. Portland and Plastic Cement Mixes:

   a. Scratch Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
   b. Brown Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Base-Coat Mixes: Single base coats for two-coat plasterwork as follows:

1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
2. Portland and Masonry Cement Mix: For cementitious material, mix 1 part portland cement and 1 part masonry cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
3. Plastic Cement Mix: Use 1 part plastic cement and 2-1/2 to 4 parts aggregate.

D. Base-Coat Mixes: Single base coats for two-coat plasterwork as follows:

1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
2. Masonry Cement Mix: Use 1 part masonry cement and 2-1/2 to 4 parts aggregate.
3. Plastic Cement Mix: Use 1 part plastic cement and 2-1/2 to 4 parts aggregate.

E. Job-Mixed Finish-Coat Mixes:

1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
2. Masonry Cement Mix: 1 part masonry cement and 1-1/2 to 3 parts aggregate.
3. Portland and Masonry Cement Mix: For cementitious materials, mix 1 part portland cement and 1 part masonry cement. Use 1-1/2 to 3 parts aggregate per part of cementitious material.
4. Plastic Cement Mix: 1 part plastic cement and 1-1/2 to 3 parts aggregate.

F. Factory-Prepared Finish-Coat Mixes: For acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster in accordance with ASTM C926.

3.3 INSTALLING METAL LATH

A. Metal Lath: Install in accordance with ASTM C1063.

1. Partition Framing and Vertical Furring: Install flat-diamond-mesh.
2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.
3. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.4 INSTALLING ACCESSORIES

A. Install in accordance with ASTM C1063 and at locations indicated on Drawings.

B. Reinforcement for External (Outside) Corners:

1. Install lath-type, external-corner reinforcement at exterior locations.
2. Install cornerbead at interior locations.

C. Control Joints: Locate as shown on drawings and as reviewed by Architect based on reviewed shop drawings for visual effect and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

   a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
   b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).

2. At distances between control joints of not greater than 18 ft. (5.5 m) o.c.
3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.

4. Where control joints occur in surface of construction directly behind plaster.
5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
6. Do not clean out control and expansion joints with sharp instruments that could puncture the vinyl.

3.5 PLASTER APPLICATION

A. General: Comply with ASTM C926.

1. Do not deviate more than plus or minus 1/4 inch in 10 ft. (6 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10 ft. (3 m) straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Walls and Ceilings; Base-Coat Mixes for Use over Metal Lath, Concrete, and Concrete Masonry Surfaces: Comply with ASTM C926 with plaster applied in two coats.

C. Acrylic-Based Finish Coat: Apply coating system, including primers, finish coats, and sealing topcoats, in accordance with manufacturer's written instructions.

D. Concealed Plasterwork:
1. Where plaster application is used as a base for adhesive application of tile and similar finishes, omit finish coat.

E. Plaster Finish Coats: Apply finish coat to achieve Uniform Finish as approved through mock-up review ready for Paint. Finish will be compared to reviewed mock-up for consistency per the judgement of the Architect. Areas found inconsistent with mock-up must be removed or re-worked to achieve consistent results.

3.6 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

END OF SECTION 092400

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Exterior gypsum board for ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. Comply with the following as a minimum requirement:

1. ANSI A97.1 "Specifications for Application and Finishing of Gypsum Wallboard."
2. "Drywall Construction Handbook" of the California Drywall Contractor's Association.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by the following, or equal:
1. Georgia-Pacific Building Products.
2. National Gypsum Company;
3. United States Gypsum Company.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 1/2 inch (12.7 mm) Min. or thicker as required for span and application.
2. Long Edges: Tapered.

D. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
1. Core: As indicated.

2.5 EXTERIOR GYPSUM BOARD FOR WALLS

A. Glass- Mat Gypsum Sheathing Board: Meeting 9 or greater for ASTM D3273 mold resistance.
1. Core: As indicated
2. Type: DensGlass Gold, or equal.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    c. L-Bead: L-shaped; exposed long flange receives joint compound.
    d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    e. Expansion (control) joint.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized-steel sheet, or rolled zinc.
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints**,** rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

D. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

E. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

B. Comply with ASTM C 840.

C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

F. Form control and expansion joints with space between edges of adjoining gypsum panels.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 3/8-inch wide spaces at these locations and trim edges with edge trim

where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

I. Prefill open joints**,** and damaged surface areas.

J. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

K. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 3: Janitorial, IT Support, Electrical, Storage support spaces.
3. Level 5: At all interior wall and ceiling surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

L. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

M. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.2 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

3.3 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 29 00

SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Porcelain tile.
3. Glass tile.
4. Glazed wall tile.
5. Tile backing panels.
6. Waterproof membrane for thinset applications.
7. Crack isolation membrane.
8. Metal edge strips.
9. Artist Provided Ceramic Art Tile

1.2 STANDARDS

A. Tile Council of North America, Inc.'s "2015 TCNA Handbook for Ceramic Tile Installation."

B. Applicable portion of ANSI A108 and A137.

1.3 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).

C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide samples of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.
3. Stone thresholds.

C. Shop Drawings: provide an accurately drawn plan showing locations of each type of tile and tile pattern, and clearly indicating the following joints and information: Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of product, signed by product manufacturer.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain all grouting and setting products, including mortar, adhesives, membranes, and grouts one of the following manufacturers:
1. Laticrete
2. Custom Building Products
3. Mapei
4. Or approved equal.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical wall and floor assemblies was requested by owner.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

A. Tile as indicated on finished plans, including color, pattern and grout color.

B. Or approved equal.
1. Or equal submittals must include both samples of the originally specified tile and the proposed “or equal” for architects review. Tiles not achieving a true equivalency as determined by architect will not be accepted.

2.3 TILE BACKING PANELS

A. Fiber Cement Backer Units: ANSI C 1288.
1. James Hardie
2. Custom Building Products
3. USG
4. Thickness: 1/4 inch, 1/2 inch, 5/8 inch or as indicated for substrate.

2.4 SETTING AND GROUTING MATERIALS

A. Basis of Design: Laticrete systems will form the basis of design as outlined below:

B. FLUID-APPLIED CRACK ISOLATION AND WATERPROOFING MEMBRANE:

1. Laticrete, Hydro Ban

C. THIN-SET POLYMER MODIFIED MORTAR AND ADHESIVE

1. Laticrete, Platinum 254

D. THICK-BED MORTAR

1. Laticrete, 3701 Fortified Mortar Bed

E. CLEAVAGE MEMBRANES

1. Laticrete, Fracture Ban for use under thin-set adhesives

2. 4 mil Polyethylene, or 15# builders felt for use under thick-set mortar

2.5 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Laticrete, Spectralock Pro Grout

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Laticrete, NXT Level

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Schluter Systems

2.7 PUBLIC ARTIST TILE

A. Public Artist, Janelle Iglesias has been contracted by the City of San Diego to provide Artwork, Design, Fabrication and Oversight of Tile Art Installation during Construction.
1. The Artist will arrange for the tile to be delivered directly to the project site.
2. The General Contractor will be responsible for storing the tile in a covered, secure area.

B. The Artist has collaborated with the design team to identify locations of the Artwork and integrate Public Art activities in the design and construction activities.

C. The Artwork shall be installed at the Entry Courtyard wall, paving surfaces and concrete planter as shown in the drawings.

D. The custom tile set contains approximately 30 variable tiles, including a mixture of block colored tiles and multi-colored tiles with graphic patterns abstracted from the english alphabet.
1. Tile Size: 8”x8”
2. Tile Thickness: 8-10mm
3. Identified on drawings and finish schedule at tile typle “T-18”

E. The Artist will provide:

1. Installation guide that will include both a written description and graphic map of the entire installation with enlarged details of locations with specific tile ordering or arrangement.
    a. Portions of the tile installation marked “randomized” will include a checklist of best practices that include such factors as:
        1) Percentage of blank tiles to be integrated
        2) Orientation of specific designs within the set
        3) Avoidance of creating words with randomized abstracted designs.

F. The Artist will be available to advise on Art installation frequently throughout the process and be available for communications to respond any questions or concerns.
1. Frequency and Time of site visits to be coordinated by the GC directly with the Artist.
2. Initial schedule of site meetings:
    a. Preliminary Meeting before the commencement of tile installation.
    b. Following meetings to occur at 10%, 25%, 50%, 75% and 100% completion of installation

G. The General Contractor should account for preparation, installation, protection and coordination with the Artist as required for seamless integration of the public artwork throughout the duration of the construction project.
1. The contractor shall provide the following for the Artist’ review:
    a. Product data for all setting and grouting materials for review and approval by the artist prior to the commencement of work
    b. Field verified layout drawings showing tile pattern, proposed expansion joint locations, proposed locations for field cut tiles, for review and approval by the Artist prior to commencing the work.
    c. Mock-ups for tile to verify procedures, techniques and layouts for approval by the Artist prior to commencing the work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors.
    b. Tile floors in wet areas.
    c. Tile floors consisting of tiles 8 by 8 inches or larger.
    d. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Acceptance of substrate: Installer to review conditions of substrate and notify General Contractor of any unacceptable conditions prior to commencing work. Commencement of work constitutes acceptance of substrate.

1. Wall deflection:
    a. Thin-set applications: Max. Allowable deflection L/360
    b. Thick-set applications: Max. allowable deflection L/720

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

F. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.

G. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

H. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch.
2. Glazed Wall Tile: 1/8 inch.
3. Porcelain Tile: 1/4 inch.

I. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

J. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

K. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets other flooring that finishes flush with top of tile, where exposed edge of tile flooring meets other flooring that finishes flush with or below top of tile and no threshold is indicated.

L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

M. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

N. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

O. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

END OF SECTION 09 30 13

SECTION 09 51 13

ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Sections

1. Section 09 29 00 – Gypsum Board
2. Section 09 51 26 – Acoustical Wood Ceilings
3. Section 09 51 33 – Acoustical Metal Ceilings
5. Section 01 81 13 - Sustainable Design Requirements
8. Divisions 23 - HVAC Air Distribution
9. Division 26 - Electrical

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material

A. Armstrong Fire Guard Products

10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint

11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems

12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

13. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code

C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report

1. 0244 - Armstrong Single Span Suspension System

I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

K. International Well Building Standard

L. Mindful Materials

M. Living Building Challenge

N. U.S. Department of Agriculture BioPreferred program (USDA BioPreffered).

1.4 SYSTEM DESCRIPTION

Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with, or supported by the ceilings.

D. Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

a. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 SUSTAINABLE MATERIALS

Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.

1. Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration open Standard.

2. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).

3. Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).

4. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.

5. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.

6. Products meeting LEED V4 requirements including:

Storage & Collection of Recyclables

Construction and Demolition Waste Management Planning

Building Life-Cycle Impact Reduction

Building Product Disclosure and Optimization Environmental Product Declarations

Building Product Disclosure and Optimization Sourcing of Raw Materials

Building Product Disclosure and Optimization Material Ingredients

Construction and Demolition Waste Management

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

B. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 PROJECT CONDITIONS

A. Space Enclosure:

Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

HumiGuard Max Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Ceilings with HumiGuard Max performance can be installed in conditions up to 120°F (49°C) and maximum humidity exposure including outdoor applications, and other standing water applications, so long as they are installed with either SS Prelude Plus, AL Prelude Plus, or Prelude Plus Fire Guard XL suspension systems. Products with Humiguard Max performance can be installed in exterior applications, where standing water is present, or where moisture will come in direct contact with the ceiling. Only Ceramaguard with AL Prelude Plus suspension system can be installed over swimming pools.

1.10 ALTERNATE CONSTRUCTION WASTE DISPOSAL

A. Ceiling material being reclaimed must be kept dry and free from debris.

B. Contact the Armstrong Recycle Center a consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant with provide assistance to facilitate the recycling of the ceiling.

C. Recycling may qualify for LEED Credits:

a. LEED 2009 - Category 4: Material and Resources (MR)

i. Credit MRc2: Construction Waste Management

b. LEEDv4 - MRp2 - Construction Waste Management Planning Qualifies as a material stream (non-structural) targeted for diversion. Ceilings will be source-separated and diverted through the Armstrong Ceiling Recycling Program.

c. LEEDv4-MRc5 -

i. Option 1: Divert ceilings to qualify for one of the 3 material streams (50%)

ii. Option 2: Divert ceilings to qualify for one of the 4 material streams (75%)

1.11 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping

2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) years from date of substantial completion

2. Suspension: Ten (10) years from date of substantial completion

3. Ceiling System: Thirty (30) years from date of substantial completion

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.12 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc. Dainee Tan 9492758169 dtan@armstrongceilings.com

B. Suspension Systems:

1. Armstrong World Industries, Inc. Dainee Tan 9492758169 dtan@armstrongceilings.com

C: Perimeter Systems

1. Armstrong World Industries, Inc. Dainee Tan 9492758169 dtan@armstrongceilings.com

2.2.1 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP-1

1. Surface Texture: Smooth

2. Composition: Mineral Fiber

3. Color: White

4. Size: 24 in x 24 in

5. Edge Profile: Square Tegular 9/16 in for interface with SUPRAFINE XL 9/16" Exposed Tee grid.

6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.85

7. Ceiling Attenuation Class (CAC) : ASTM C 1414; Classified with UL label on product carton 35

8. Sabin:N/A

9. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 170

10. Flame Spread: ASTM E 1264; Class A (HPVA)

11. Light Reflectance (LR) White Panel: ASTM E 1477; 0.86

12. Dimensional Stability: HumiGuard Plus

13. Recycle Content: Post-Consumer - 1% - 3% Pre-Consumer - 73% - 75%

14. Material Ingredient Transparency: Health Product Declaration (HPD); Declare Label

15. Life Cycle Assessment: Third Party Certified Environment Product Declaration (EPD)

16. Acceptable Product: CALLA, 2824 No added formaldehyde as manufactured by Armstrong World Industries

2.2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP-2

1. Surface Texture: Fine

2. Composition: Fiberglass

3. Color: White

4. Size: 24 in x 24 in

5. Edge Profile: Vector edge for interface with PRELUDE XL 15/16" Exposed Tee grid.

6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.90

7. Ceiling Attenuation Class (CAC) : NA

8. Sabin:N/A

9. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 190

10. Flame Spread: ASTM E 1264; Class A (UL)

11. Light Reflectance (LR) White Panel: ASTM E 1477; 0.90

12. Dimensional Stability: HumiGuard Plus

13. Recycle Content: Post-Consumer - 12% Pre-Consumer - 59%

14. Acceptable Product: OPTIMA Vector, 3900 as manufactured by Armstrong World Industries

2.3.1 METAL SUSPENSION SYSTEMS for AP 1

A. Components:

Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty duty

b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

c. Sustainability: Environmetal Product Declaration (EPD), Health Product Declaration (HPD)

d. Acceptable Product: SUPRAFINE XL 9/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim:

2. 7877 – 12’ Shadow Molding

E. Accessories: BERC2 Clips

2.3.2 METAL SUSPENSION SYSTEMS for AP2

A. Components:

Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty duty

b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

c. Sustainability: Environmetal Product Declaration (EPD), Health Product Declaration (HPD)

d. Acceptable Product: PRELUDE XL 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim:

1. 7897 - 10ft Seismic Shadow Molding

E. Accessories:

1. 7425 - Stabilizer Bar

2. 7445 - Stabilizer Bar
3. vector Fixture Kit
4. 442 Hold Down Clip, 441 Border Clip, 522 midpoint clip
5. BERC2 Clips

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

C. Before disposing of ceilings, contact the Armstrong Recycling Center at 877-276-7876, select option #1 then #8 to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant with provide assistance to facilitate the recycle of the ceiling.

SECTION 09 51 26

ACOUSTICAL WOOD CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes:

1. Wood veneer ceiling panels.

2. Exposed grid suspension system.

3. Wire hangers, fasteners, main runners, cross tees, wall angle moldings and accessories.

B. Related Sections:
1. Section 09 96 00 (09960) – High Performance Coatings
2. Division 23 (15) - HVAC
3. Division 26 (16) Sections - Electrical Work

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products which have not been approved by Addenda, the specified products shall be provided without additional compensation.

2. Submittals which do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not neccessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); panel design, size, composition, color, and finish; suspension system component profiles and sizes; compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process.

3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

8. ASTM E 580 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.

9. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.

10. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.

11. ASTM E 1264 Classification for Acoustical Ceiling Products.

B. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

C. International Code Council-Evaluation Services - Evaluation Report, ESR-1308, Fire- and Nonfire-Resistance-Rated Suspended Ceiling Framing Systems

D. ASCE 7 Standard - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

E. CISCA Seismic Zones 3 & 4 - Ceilings and Interior Systems Construction Association Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies

1.4 SYSTEM DESCRIPTION

A. Seismic Loads: Design and size components to withstand seismic loads in accordance with the International Building Code, Section 1621 for Category D,E, and F.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of ceiling unit and suspension system required.

B. Installation Instructions: Submit manufacturer's installation instructions as referenced in Part 3, Installation.

C. Samples: Minimum 3 1/2 inch x 5 1/2 inch stained samples of specified wood veneer ceiling units. Color of stained samples as selected from manufacturers full line of stains; 8-inch-long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

D. Shop Drawings: Layout and details of ceilings. Show locations of items which are to be coordinated with or supported by the ceilings.

E. Certifications: Manufacturer's certifications that system complies with specified requirements:

1. For seismic performance: International Code Council Evaluation Report, ESR-1308

2. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

F. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

G. Mock-up: Provide Mock-up of ceiling system as specified in Section 01 40 00 Quality Requirements.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.

a. Flame Spread: 25 or less

b. Smoke Developed: 50 or less

2. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.

C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.

D. Seismic Performance: Provide acoustical ceiling system that has been evaluated by an independent party and found to be compliant with the 2003 International Building Code, Seismic Category D, E, and F.

1. Tested per International Code Council - Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components as evidenced by International Code Council Evaluation Report, ESR-1308.

E. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store ceiling components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.

B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.

C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

1.8 PROJECT CONDITIONS

A. Wood veneer ceiling materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).

B. The wood veneer panels should not be installed in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space.

C. As interior finish products, the wood veneer panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.9 WARRANTY

A. Wood Veneer Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:

1. Ceiling Panels: Defects in materials or factory workmanship.

2. Grid System: Rusting and manufacturing defects.

B. Warranty Period:

1. Wood veneer panels: One (1) year from date of installation.

2. Grid: Ten years from date of installation.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Ceiling Units: Furnish quality of full-size units equal to 2.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 1.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels: Armstrong World Industries, Inc. Dainee Tan 9492758169 or approved equal.

B. Suspension Systems Armstrong World Industries,, Inc. Dainee Tan 9492758169 dtan@armstrongceilings.com or approved equal

2.2.0 WOOD VENEER CEILING UNITS

A. Ceiling Panels Type WP-1:

1. Surface Texture: Smooth

2. Composition: Wood

3. Finish: Waterbourne Semi Transparent Stain as specified in Section 099000 “Painting”

4. Species:Maple

5. Perforations:

1. Pattern # RD 6006

a. Hole size: 6 mm

b. On center spacing: 32.0 mm

c. % Open area: 6.0

c. Size: 24in X 48in X 3/4in

d. Edge Profile: Square Tegular for interface with Suprafine XL 9/16" Exposed Tee. .

e. Edge Banding and Trim: To match face veneer

f. Noise Reduction Coefficient (NRC): ASTM C 423; 0.40

g. Ceiling Attenuation Class (CAC): ASTM C 1414; 28

h. Flame Spread: ASTM E 1264; Class A (HPVA)

i. Dimensional Stability: Standard

j. Acceptable Product: WoodWorks Tegular, item# 6486W3, as manufactured by Armstrong World Industries.

B. Accessories:

1. WoodWorks Infill Panel (fiberglass infill) #8200100

2. Edge Banding for field-modified panels: Pre-finished pressure sensitive adhesive banding is available ½ inch wide and in 25 foot lengths.

    a. Item #6408

2.3.0 SUSPENSION SYSTEMS

A. Components: Main beams and cross tees In accordance with the International Building Code, Section 1621 for Category D, E and F as described in ESR-1308.

    1. Structural Classification: ASTM C 635, Heavy Duty.

    2. Color: Silver Satin or as indicated on the drawings/finish schedule.

    3. Represented Systems: Suprafine XL 9/16" Exposed Tee System as manufactured by Armstrong World Industries.

B. Attachment Devices: In accordance with the International Building Code, Section 1621 for Category D, E, and F.

C. Wire for Hangers and Ties: In accordance with the International Building Code, Section 1621.

D. Wall Moldings: In accordance with the International Building Code, Section 1621 for Category D, E. and F or method as described in ESR-1308.

    1. Nominal 7/8 inch x 7/8 inch hemmed, pre-finished angle molding (7800) (7802) (7803) (780036) (HD7801)

E. Accessories:

1. BERC2 - 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to wall molding.

2. SJCG - Seismic Joint Clip, 5 inches x 1-1/2 inch, hot-dipped galvanized cold-rolled steel per ASTM A568. The two piece unit is designed to accommodate a seismic separation joint. The clip is compatible with 15/16 inch and 9/16 inch grid systems including Prelude, Suprafine, and Silhouette The SJCG is not suitable for use with Vector panel installations.

3. SJMR15 - Seismic Joint Clip - Main Beam, 1 inch x 4 inches, commercial quality cold rolled hot dipped galvanized steel per ASTM A568, chemically cleansed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.

B. Proper design for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION (Category D,E,F)

A. Install suspension system and panels in accordance with the International Building Code, Section 1621, except as noted in Section 4.4.3.1 of ESR-1308, and with the authorities having jurisdiction.

B. ESR-1308, Section 4.4.3.1, Alternate Seismic Design Category D,E and F Installation:

Under this installation, the runners must be rated heavy-duty and have a minimum simple span uniform load of 16.35 pounds per lineal foot (238 N/m); maximum ceiling weight permitted is 4.0 pounds per square foot (19.5 kg/m2).

1. The BERC-2 clip is used to secure the main runners and cross runners on two adjacent walls to the structure and the two opposite walls to the perimeter trim, as detailed below. A nominal 7/8-inch (22 mm) wall molding is used in lieu of the 2-inch (51 mm) perimeter supporting closure angle required by Section 9.6.2.6.2.2 (b) of ASCE-7 for Seismic Design Categories D, E and F. Except for the use of the BERC-2 clip and the 7/8-inch (22 mm) wall molding and elimination of spreader bars, installation of the ceiling system must be as prescribed by the applicable code.

2. The BERC-2 clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. Clips installed on the walls where the runners

are fixed are attached to the runner by a sheet metal screw through the horizontal slot in the clip into the web of the runner.

Alternate #2: If acceptable to architect, fixed attachment may be accomplished by pop-riveting the runner to the wall molding.

3. Clips installed on the walls where the runners are not fixed to the runner allow the terminal runner end to move 3/4 inch (19.1 mm) in both directions. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading in lieu of spacer bars required in CISCA 3-4, which is referenced in ASCE 7, Section 9.6.2.6.2.2, which is referenced in IBC Section 1621.

C. The SJCG Seismic Separation Joint Clip is to be installed per the manufacturer's instructions, CS-3815.

D. The SJMR15 Seismic Joint Clip Main Beam is to be installed per the manufacturer's instructions, CS-3955.

E. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C636 shall be required in addition to the requirements of the International Building Code, Section 1621.2.5 and with the authorities having jurisdiction.

1. Only applies when using Prelude XL Fire Guard 15/16 ½; Prelude Plus XL Fire Guard 15/16 ½; and Suprafine XL Fire Guard 9/16 ½ Exposed Tee Systems.

F. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

G. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 FIELD QUALITY CONTROL

- Suspended ceiling shall be subject to the special inspection requirements in Section (01 40 00) – Quality Requirements

3.5 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 26

SECTION 09 51 33

ACOUSTICAL METAL CEILINGS

PART 1 - PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Section Includes:

1. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section

1.2 SUMMARY

A. Section Includes

1. Acoustical metal ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Sections:

1. Section 01 81 13 - Sustainable Design Requirements
2. Section 01 91 13 – General Commissioning Requirements
2. Section 09 29 00 – Gypsum Board
3. Section 09 51 13 – Acoustical Tile Ceilings
4. Section 09 51 26 – Acoustical Wood Ceilings
7. Section 09 54 00 - Acoustical Blade Ceilings
8. Divisions 23 - HVAC Air Distribution
9. Division 26 - Electrical

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent

upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
10. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
11. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
12. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code

C. ASHRAE Standard 62 1 2004 Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report

1. 0244 - Armstrong Single Span Suspension System

I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

K. International Well Building Standard

L. Mindful Materials

M. Living Building Challenge

N. U.S. Department of Agriculture BioPreferred program (USDA BioPreffered).

1.4 SYSTEM DESCRIPTION

Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with, or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acousti-

cal performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

F. Mock-up: Provide mock-up of ceiling system as specified in Section 014000 “Quality Re quirements”

1.6 SUSTAINABLE MATERIALS

A. Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.

B. Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration open Standard.

C. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).

D. Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).

E. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.

F. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.

G. Products meeting LEED V4 requirements including:

a. Storage & Collection of Recyclables

b. Construction and Demolition Waste Management Planning

c. Building Life-Cycle Impact Reduction

d. Building Product Disclosure and Optimization Environmental Product Declarations

e. Building Product Disclosure and Optimization Sourcing of Raw Materials

f. Building Product Disclosure and Optimization Material Ingredients

g. Construction and Demolition Waste Management

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

a. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

C. Acoustic Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection en gineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

D. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 PROJECT CONDITIONS

A. Space Enclosure:

a. Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

B. HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

C. HumiGuard Max Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Ceilings with HumiGuard Max performance can be installed in conditions up to 120°F (49°C) and maximum humidity exposure including outdoor applications, and other standing water applications, so long as they are installed with either SS Prelude Plus, AL Prelude Plus, or Prelude Plus Fire Guard XL suspension systems. Products with Humiguard Max performance can be installed in exterior applications, where standing water is present, or where moisture will come in direct contact with the ceiling. Only Ceramaguard with AL Prelude Plus suspension system can be installed over swimming pools.

1.10 LEED

A. Armstrong Metal Ceilings qualify for the following credits:

1. Category - Material & Resources
2. MR Credit 2.1, 2.2 - Construction Waste Management Divert 50% or 75% from disposal
3. MR Credit 4.1, 4.2 - Recycled Content
4. MR Credit 5.1, 5.2 - Regional Materials (dependent on location)
5. LEED NC - 10% Extracted, Processed & Manufactured Regionally LEED CI - 20% Manufactured Regionally
6. Category - Indoor Environmental Quality
7. EQ Credit 4.1 to 4.6 - Low-Emitting Materials
8. Category - Innovation and Design Process
9. ID Credit - Acoustic Performance

1.11 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical Metal panels: One (1) year from date of substantial completion

2. Grid: Ten (10) years from date of substantial completion

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.12 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Metal Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Metal Ceiling Panels:

1. Armstrong World Industries, Inc. Contact: Dai-Nee Tan Tel: 9492758169 or approved equal substitute

B. Suspension Systems:

1. Armstrong World Industries, Inc. Contact: Dai-Nee Tan Tel: 9492758169 or approved equal substitute

C. Aluminum Custom Trims:

1. Armstrong World Industries, Inc. Contact: Dai-Nee Tan Tel: 9492758169 or approved equal substitute.

2.2.1 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AMP1

1. Acoustical Panels Type AMP-1(Interior)

a. Surface Texture: Smooth

b. Composition: Metal

c. Color: WH, SG, MY

d. Size:24 in x 24 in

e. Edge Profile: Tegular 9/16 in for interface with Suprafine 9/16" Exposed Tee grid.

f. Perforation Option: Round - Diagonal

g. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton 0.70

h. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton 31

i. Sabin: N/A

j. Articulation Class (AC):

k. Flame Spread: ASTM E 1264; Class A (FM).

l. Light Reflectance (LR) White Panel: ASTM E 1477; 0.61.

m. Dimensional Stability: Standard

n. Recycle Content: Post-Consumer - 0% Pre-Consumer - 25%

A.q. Acceptable Product: METALWORKS Tegular 6464 No added formaldehyde as manufactured by Armstrong World Industries

2. Metal Panel Accessories: 6099 Edge Cap

2.3.1 METAL SUSPENSION SYSTEMS

A. Components:

B. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty duty

b. Color: match the actual color of the selected ceiling tile, unless noted otherwise.

c. Recycle Content: Post-Consumer - 23% Pre-Consumer - 7%

d. Sustainability: Environmetal Product Declaration (EPD), Health Product Declaration (HPD)

e. Acceptable Product: Suprafine XL 9/16" Exposed Tee as manufactured by Armstrong World Industries

C. Attachment Devices:
Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

D. C. Wire for Hangers and Ties:
ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

E. Edge Moldings and Trim:

1. 7877 - 12' Wall Molding
E. Accessories: BERC2 Clips,

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

a. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Follow manufacturer installation instructions

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

D. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

E. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 33

SECTION 09 54 00

ACOUSTIC BLADE CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sound-absorbing ceiling baffles.

1.02 RELATED REQUIREMENTS

A. Section 09 51 13 – “Acoustical Tile Ceilings”

B. Section 09 51 26 – “Acoustical Wood Ceilings”

C. Section 09 51 33 – “Acoustical Metal Ceilings

C. Section 09 90 00 – “Painting”

1.03 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2016.

1.04 SUBMITTALS

A. Product Data: Manufacturer's printed data sheets for products specified.

B. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.

C. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.

D. Verification Samples: Fabricated samples of each type of panel specified; Full depth, 12" minimum length, showing construction, edge details, and fabric covering.

E. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project..

1. Extra Panels: Quantity equal to 5 percent of total installed, but not less than one of each type.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.

B. Store units flat, in dry, well-ventilated space; do not stand on end.

C. Protect edges from damage.

D. acclimatize product for minimum 24 hours at temperature and humidity approximately that of occupancy prior to installation.

PART 2 PRODUCTS

2.01 FABRIC SOUND-ABSORBING UNITS

A. Manufacturers:

1. Basis of Design:

a. Turf Design; Product Slab Acoustic Baffle: www.turf.design

b. or approved equal.

B. Sound Absorbing Units: Prefinished, factory assembled, sound absorptive panels.

1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2. UL Tested ASTM E-84: Class A

C. Acoustical Panels for Ceilings:

1. Noise Reduction Coefficient (NRC): ASTM C 423: NRC 500hz > 1.00, NRC 1000hz
   i. 1.50, Avg. apparent NRC > 1.50, when tested in accordance with ASTM C423 for Type ceiling mounting, per ASTM E795.
2. Panel Size: 8.68" inches by 90" inches.
3. Panel Thickness: 2.125 inches.
4. Edges: Perimeter edges reinforced by single sheet of folded felt.
5. Corners: Square. Exposed Felt
6. Fabric: 99% Recycled Polyester Felt.
7. Color: #47 Lime
8. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.
9. Mounting Method: Horizontally suspended from ceiling.
   a. Suspended with Unistrut P1000T Standard supplied by installer.
   b. Suspended with 1/16” steel aircraft cable, inserted into integral spring clips, supplied by manufacturer.

2.02 FABRICATION

A. Fabric Wrapped, General: Fabricate panels to sizes and configurations indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.
   a. Where radiused or mitered corners are indicated, install fabric to avoid seams or gathering of material.

B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and square-ness from corner to corner.

2.03 ACCESSORIES

A. Ceiling-Suspended Accessories: Manufacturer's standard accessories at locations indicated on each acoustical unit, sized appropriately for weight of acoustical unit.

1. Through-threaded eyelets bolted through concealed perimeter frame.

2. Contractor to provide and install unistrut as required for baffle installation.

a. Suspend unistrut at elevations indicated on drawings

b. Install unistrut at lengths indicated on drawings.

3. Provide ceiling mounting points for cable suspension from ceiling at heights indicated.

B. Trim Moldings: Manufacturer's standard wood or vinyl trim moldings for concealing panel joints; color as selected from manufacturer's standards.

C. Fixing Clips: Manufacturers standard for application indicated.

D. Panel Adhesive: Acceptable to acoustical panel manufacturer for application indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install acoustical units in locations indicated, following manufacturer's installation instructions.

B. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.

C. Suspend ceiling baffles at locations and heights indicated.

D. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:

1. Plumb and level.

2. Flatness.

3. Width of joints.

3.03 CLEANING

A. Clean fabric facing upon completion of installation from dust and other foreign materials,

following manufacturer's instructions.

B. Vacuum occasionally to remove any particulate matter and air-borne debris or dust. Compressed air can be used to dust the material in difficult to reach areas or for large assemblies.

3.04 PROTECTION

A. Provide protection of installed acoustical panels until completion of the work.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION 09 54 00

SECTION 09 65 19

RESILIENT TILE FLOORING

PART 1 – GENERAL

1. SUBMITTALS
    a. Product Specification
    b. Specification for Adhesive
    c. Floor Layouts
    d. Samples
    e. Schedule
2. CLOSEOUT SUBMITTALS
    a. Maintenance Instructions
    b. Warranty
3. QUALITY ASSURANCE
    a. Environmental: FloorScore® Certified
    b. Mockups: Install 100 sf of product at designated location for architect review and approval.
4. MATERIAL STORAGE AND HANDLING
    a. Store tiles on a flat surface and squarely on top of one another.
    b. Store away from vents and direct sunlight.
    c. When palletizing, first place a 5/8” or thicker plywood on the pallet. Stack 2 rows high side by side with no airspace between. Then quarter turn for 2 rows side by side. Do not exceed 12 boxes high. If you are stacking pallets, use a 1” thick plywood in between pallets.
    d. Store in protected dry conditions between 65 and 85 degrees.
5. SITE CONDITIONS
    a. The permanent HVAC system must be on for 7 days prior to, during and after installation between 65 and 85 degrees Fahrenheit or 18 to 29 degrees Celsius.
    b. Material and adhesive must be acclimated to the installation area for a minimum of 48 hours prior to installation.

PART 2 – PRODUCTS

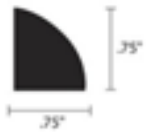
6. TESTING REQUIREMENTS
    a. Slip Resistance ASTM D2047: ADA Compliant
    b. Static Load Limit ASTM F970: 1200 psi
    c. Residual Indentation F1914: Passes , 8%
    d. Flexibility ASTM F137: Passes
    e. Resistance to Heat ASTM F1514: Passes
    f. Resistance to Light ASTM F1515: Passes
    g. Resistance to Chemicals ASTM F925: Passes
    h. Radiant Flux ASTM E648: 0.45 W/sq. cm., Class I

i. Smoke Density ASTM E662: Passes, <450

7. RESILIENT TILE SYSTEM
   a. Single Source System: Provide complete Resilient Flooring and Base System including adhesives, barrier coats, primers, etc. from single source supplier.
   b. Basis of Design: Products manufactured by Shaw Contract Group, Representative: Debra Smith 949-939-3496.
      i. Or approved equal.
8. RESILIENT TILE
   a. Product: Cove, 0927V
   b. Construction: Loose Lay Luxury Vinyl Tile
   c. Class ASTM F1700: Class III Printed Film Vinyl Plank, Type B (Embossed)
   d. Wear-layer Thickness: 0.020 in | 20 mil
   e. Overall Thickness: 0.197 in | 5.0 mm
   f. Nominal Dimensions: 9 in wide, 48 in long
   g. Finish: ExoGuard™
   h. Installation: Loose Lay / Glue Down
9. INSTALLATION MATERIALS
   a. Adhesives:

i. Shaw 4100 spreadable	95% RH		pH 7-10
ii. S150 spray	95% RH		pH 7-11
iii. Shaw 200 for low demand areas	90% RH	8 lbs	pH 7-10
iv. Shaw MM800 for Shift + Tilt	90% RH	8 lbs	pH 5-9

   b. Weld Rod
      i. Heat
      ii. Chemical
   c. Primer: Shaw 9050
   d. Leveling and Patching Compounds: Use only Portland-based patching and leveling compounds. Do not install resilient flooring over gypsum-based patching and/or leveling compounds.
   e. Take Abatement Coating: Shaw 6200
   f. Barrier Coat Floor Encapsulation: Shaw 9000
   g. Cove Base Accessories:
      i. Angle Profile
      ii. Quarter Round Profile
   h. Floor Polish



PART 3 – EXECUTION

10. EXAMINATION
    a. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content, pH, smoothness and level.
    b. Proceed with installation after any unsatisfactory conditions have been corrected.
11. PREPARATION

a. Concrete substrates should be tested for Internal Relative Humidity according to ASTM F 2170 and must not exceed 90% RH.
b. The PH of the concrete sub-floor must be between 7 and 10.
c. Substrates shall be smooth, structurally sound, permanently dry, clean and free of all foreign material such as dust, wax, solvents, paint, grease, oils, old adhesive residue, curing and hardening/ curing compounds, sealers and other foreign material that might prevent adhesive bond.
d. Concrete floors shall be flat and smooth within 1/8" in 6 feet or 3/16" in 10 feet.

12. INSTALLATION
    a. LAYOUT AND INSTALLATION
    b. Install using conventional tile and plank installation techniques. Plank products should have a minimum of 6 to 8" seam stagger.
    c. Center rooms and hallways so borders are not less than half of a tile or plank.
    d. Work out of multiple boxes at the same time.
    e. In hallways and small spaces, work lengthwise from one end.
    f. Ensure cut edges are always against the wall.
    g. To cut products, score the top side of the material with a utility knife. Bend the product and finish the cut through the back side. It may be necessary to use a heat gun to cut around vertical obstructions. Allow the heated product to return to room temperature before installation.
    h. If you cut the product into a fine point, it may delaminate. Use an ethyl cyanoacrylate-based super glue to fuse the points together. Clean all glue from the top surface immediately. Alcohol-based super glues may cause the vinyl to swell.
    i. Roll the plank or tile with a 3-section 100 lb. roller. Re-roll the floor within the working time of the adhesive. Continue to roll the floor throughout the working day to ensure a proper bond.
    j. Use floor protection after installation. DO NOT use a plastic adhesive-based protection system.
13. MAINTENANCE
    a. Initial Maintenance
        i. Sweep, vacuum or dust mop to remove dirt and grit.
        ii. If needed, add neutral cleaner to cool water following the manufacturer's instructions.
        iii. Scrub with a low-rpm machine or auto scrubber. Use a red pad or brush.
        iv. Never use brown or black pads (too aggressive and can damage the product)
        v. Remove the cleaning solution with a wet-dry vacuum or auto scrubber until the floor is dry.
        vi. Rinse the floor with clean water. Repeat the rinse process if necessary to remove all haze.
    b. Routine Maintenance
        i. Sweep, vacuum or dust mop to remove dirt and grit.
        ii. Add neutral pH cleaner to cool water following the manufacturer's instructions.

iii. As needed, scrub with a low-rpm machine or auto scrubber to retain appearance. Use a red (light scrubbing) pad and neutral cleaner following the manufacturer's instructions.

c. Preventative Floor Care
   i. Use walk-off mats that are as wide as the doorway and long enough for soil load and weather conditions.
   ii. Use mats with a non-staining backing.
   iii. Floor protectors should be used on all furniture legs.
   iv. The surface area of the floor protectors should be no less than 1" in diameter.
d. Full maintenance instructions will be provided by the manufacturer.

END OF SECTION 09 65 19

SECTION 09 68 10 - MODULAR TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Woven vinyl floor tile with vinyl backing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.

2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

D. Samples: Full-size units of each color and pattern of floor tile required.

E. Samples for Initial Selection: For each type of floor tile indicated.

F. Samples for Verification: Full-size units of each color and pattern of floor tile required.

G. Product Schedule: For floor tile. **WVF-1**

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials to the installation site in the manufacturer's original packaging and in good condition. Packaging to contain manufacturer's name and marks, identification number, shipping and handling instructions and related information.

B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 68° F (20° C) or more than 75° F (24° C), and measures between 10% and 65% in relative humidity (RH).

C. Environmental Limitations: Do not deliver or install flooring until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than [68° F (20° C] or more than [75° F (24° C], in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than [68° F (20° C] or more than [75° F (24° C].

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

1.8 WARRANTY

Commercial indoor 10-year warranty for Vinyl Back products:

A. PRODUCTS AND PERSONS COVERED: Warranty for indoor applications of its vinyl-back tiles and plank tiles. The warranty is for the original end-user only and is non-transferrable and non-assignable.

Commercial outdoor 5-year warranty for Vinyl Back products:

A. Same warranty as stated above.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Pill Test / DOC-FF-1-70 (ASTM D-2589) - Requirement: Pass

B. Flooring Radiant Panel / ASTM E-648 - Requirement: Class I (Above .68 w/cm)

C. Optical Smoke Density: Rating not more than 400

D. CRI VOC Chamber Test/Indoor Air Quality test (CRI-IAQ) Green Label Plus™ Test.

E. Lightfastness: Rating of not less than 5 on International Grey Scale after 40 AFU's when tested in accordance with AATCC Test Method 16E.

F. Dimensional Stability; Change not greater than 0.05%

G. Impact Insulation Classification (ASTM E 492-09): IIC Rating of 53

H. Slip Resistance (ASTM 1028-96): Complies with ADA Guidelines for level surface

I. This product is certified Green Label Plus by CRI for emission of VOC's less than 0.5 mg/m^3 or less. This product complies with California DPH Section 01350 Version 1.1 Private Office Scenario.

2.2 WOVEN VINYL FLOOR TILE- **WVF-1**

A. Manufacturer:

1. Basis of Design: Plynyl Vinyl Backed modular tile; by Chilewich, 44 East 32nd Street, New York, NY 10016. Chilewichcontract.com

B. Face Fabric: Woven Vinyl fabric with TerraStrand

C. Backing: Plynyl Vinyl backing system comprising vinyl and fiberglass

D. Total Weight (Nominal Average): 12.80-13.94 ounce / square foot

E. Standard Size: 18" x 18" (45.7cm x 45.7cm)

F. Thickness: Manufacture’s standard.

G. Testing Specifications - Pill Test: Yes

H. Testing Specifications - Flooring Radiant Panel: Class 1

I. Testing Specifications - Smoke Density: Less than 400 flaming (ASTM E 662)

J. Colors and Patterns: Matching color and pattern as indicated.

2.3 INSTALLATION MATERIALS

A. Leveling and Patching Compounds by trowel method: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Adhesive:

a. AAT #675 multi-purpose adhesive
b. Mapei Ultra-bond ECO 811
c. AAT #390 Premium Marine/Outdoor adhesive (exterior applications only)

2. Primer:

a. AAT #570
b. Mapei Primer L

3. Adhesives shall have a VOC content of 50 g/L or less.

4. California VOC Compliance: Solvent Free Product SCAQMD Rule 1168: VOC compliant.

C. Molding Accessories: Rubber transition strips for transitions between different flooring systems in profiles indicated on the Drawings.

D. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Tile installation shall not commence until painting and finishing work is complete and ceiling and overhead work is tested, approved and completed. Traffic shall be closed during the installation of the tile flooring products. Verify concrete slabs are dry per the standards for bond and moisture tests listed in the manufacturer's installation instructions

B. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of flooring products.

1. Floors and substrates must be clean and dry, free of dirt, oil, grease, wax, old paints, old adhesive, cut back adhesives, powdery surface conditions or any other substance which will compromise the adhesion or ability of the product to stick to the substrate onto which it is being installed. Any contaminant on the sub-floor must be cleaned or neutralized before applying adhesive to bond the flooring material to it. Failure to clean contaminants from the sub-floor can cause adhesive failure and allow the flooring material to come loose. Do not use sweeping agents. Sub-floors should be swept, vacuumed and damp mopped to remove soils that may contaminate or compromise the installation

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

    a. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level.
    b. Moisture vapor emission should be tested according to ASTM F 1869-98 Anhydrous Calcium Chloride Moisture Test using the Quantitative Method. This test should be conducted using the standard calcium chloride test kit. Moisture vapor emission rates shall not exceed 5 pounds/1,000 square feet within 24 hours using the anhydrous calcium chloride test.

C. Primer - A primer must be used over gypsum or Portland cement-based floor-leveling compounds. Allow floor-leveling compounds to dry properly as recommended by their manufacturers before applying the primer.

D. New Concrete - New concrete must be fully cured and free of moisture (see ASTM F 710). New concrete requires a curing period of approximately 90 days.

E. Old Concrete - Old concrete must be checked for moisture. Dry, dusty, porous floors must be primed or encapsulated.

F. Wood - Wood floors must be APA flooring grade smooth and level, or Can-Ply Select Grade. If the floor is uneven, an approved underlayment will be required.

G. Terrazzo / Marble - Level all grout lines with Portland cement-based patch reinforced with polymers. Glossy surfaces must be sanded for proper adhesive bond. Waxes and similar finishes must be removed.

H. Other Hard Surfaces (VCT/VAT) - Tiles must be well secured to the floor or removed. Broken, damaged or loose tiles must be replaced. Waxes and similar finishes must be removed from VCT before applying adhesive. Existing sheet vinyl is not a suitable substrate for modular installation and must be removed.

I. Carpet - Remove old carpet and carpet adhesives by scraping or other mechanical means. Any remaining adhesive residues may be covered with a Portland based patching compound or encapsulated.

J. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

1. Access Flooring: Stagger joints of carpet tiles so tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with adhesive; keep seams free of adhesive.

K. Fill cracks, holes, and depressions in substrates with leveling and patching compound by troweling; remove bumps and ridges to produce a uniform and smooth substrate.

L. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move floor tile and installation materials into spaces where they will be installed.

M. Immediately before installation, sweep and vacuum clean substrates to be covered by floor tile.

3.3 FLOOR TILE INSTALLATION

A. General: Comply with tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

D. Mix the tile from different boxes so that a random pattern of tile is achieved. In addition, each tile will have a number printed on the back with the arrow note above. The installer should randomly mix the 1-4 numbers within areas, and throughout the entire installation.

E. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

F. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

H. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

J. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Maintain ambient room temperature at 65°F and relative humidity between 10% and 65% for 48 hours.

C. Protect flooring and related adhesives shall be protected from the direct flow of heat from heating fixtures and appliances such as hot-air registers, radiators, or other. Site conditions shall include those specified in the flooring manufacturer's installation instructions and shall also include sufficient heat, light and power required for effective and efficient working condition

D. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.

E. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

F. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

G. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 13

CARPET TILE

PART 1: GENERAL

1.1 SECTION INCLUDES:

A. Manufacturers
B. Testing Protocols
C. Performance Requirements
D. Product Specifications
E. Environmental Requirements
F. Warranties
G. Exclusions
H. Installation
I. Maintenance
J. Accessories

1.2 REFERENCES

American Association of Textile Chemists and Colorists (AATCC):

A. AATCC 16 – Test Method for Colorfastness to Light
B. AATCC 107 – Test Method for Colorfastness to Water
C. AATCC 129 – Test Method for Colorfastness to Ozone in the Atmosphere under High Humidity.
D. AATCC 134 – Test Method for Electrostatic Propensity of Carpets.
E. AATCC 165 – Test Method for Colorfastness to Crocking: Carpets – AATCC Crock Meter Method
F. AATCC 175 – Test Method for stain Resistance: Pile Floor Coverings

American Society for Testing and Materials (ASTM):

A. ASTM D418 – Methods for Testing Pile Yarn Floor Covering Construction (Finished Pile Thickness only)
B. ASTM E648 – Test Method for Critical Radiant Flux of Floor Covering Systems
C. ASTM E662 – Test Method for Specific Optical Density of Smoke

International Standards Organization (ISO):

A. ISO 2551 – Test Method for Dimensional Stability (Aachen Test)

Carpet and Rug Institute (CRI):

A. CRI Indoor Air Quality Testing and Labeling Program

1.3 PERFORMANCE REQUIREMENTS

Comply with the following performance requirements:

A.	Radiant Panel: ASTM E648:	>.45 watts/sq. cm: Class 1
B.	Smoke Density: ASTM E662:	450 Flaming Mode - Maximum
C.	Static Generation: AATCC 134:	3.5 KV - Maximum
D.	Lightfastness: AATCC 16E:	Min 4.0 at 40 hrs.
E.	Crocking: AATCC 165:	4.0 – Wet/Dry
F.	Cold Water Bleed: AATCC 107:	3.0 - Minimum
G.	Ozone Fade: AATCC 129:	3.0 - Minimum
H.	Soil Protection: AATCC 189:	500 PPM Min.
I.	CRI Green Label Plus Air Quality Certification: Pass	
J.	CRI Appearance Retention Rating	3.0 minimum – Heavy Traffic 3.5 minimum – Severe Traffic
K.	Aachen Test: ISO 2551	Less than .15% shrinkage or growth

L. Stain protection: AATCC 175: Equal to or greater than 8.0 on Red 40 stain test.

Special Performance Requirements

A. Must have Soil and Stain Resist treatment
B. Must have minimum 20 dpf fiber
C. Must have Trilobal cross-section

1.4 SUBMITTALS

A. Manufacturer's Data
   1. Submit two (2) copies of manufacturer's specifications and installation instructions for carpet tile and related items specified.

B. Fiber Requirements
   1. Submit certification from the fiber producer verifying the following:
   2. Use of the specified fiber in the submitted carpet product.

C. Warranties
   1. Submit warranties as described in Section 1.13

D. Maintenance
   1. Maintenance Manual – submit manual of carpet manufacturer's recommendations for the general care, cleaning and maintenance of carpet tile products.

E. Certificate of Compliance
   1. Submit certified test reports that carpet tile meets all the performance requirements stated above in section 1.3 Performance requirements. Submit certified test reports from a NVLAP Certified Lab that carpet meets all performance criteria.

F. Shop Drawings
   1. For carpeted areas submit shop drawings showing installation of carpeting, pattern direction, necessary installation accessories, and provisions for work of other trades. Show location of different patterns or styles of carpet tile. Also show locations of any threshold conditions

2. The contractor will supply reproducible prints on request, to facilitate shop drawing preparation.

G. Samples
Submit standard-size carpet tile samples of each type of carpet, in each specified pattern, color and construction.

Any alternates to specified products must be submitted for approval by a representative of the end user or architect/design firm at least ten (10) working days prior to bid or proposal.

1. Final Sample Submittal

a. Submit two (2) sets of samples for each carpet type.

b. No carpet shipments are permitted until acceptance of final samples is given by representative of the end user or architect/design firm, certifying that samples are the approved color, pattern and texture.

2. Custom Color only

a. A representative of the end user or architect/design firm, certifying that the samples are the approved color, pattern and texture, shall sign high quality color samples.

b. Samples submitted are assumed to be the manufacturer's best obtainable match to the color described under Materials Section.

c. Must have federally registered Branded trademark.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data
1. Include maintenance procedures, recommended cleaning and stain removal materials, and recommended cleaning schedule. Include product data and Safety Data Sheets (SDS) for cleaning and stain-removal materials.

B. Installation Instructions
1. Include detailed installation procedures. Include carpet tile installation procedures, adhesive types, trowel sizes, spread rates, open times, and Safety Data Sheets (SDS) for all carpet tile adhesives.

C. Warranties and Performance Certifications
1. Submit written warranties for all products as well as performance testing results on all items included in Warranty section and Performance section of this specification.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Provide products from a single manufacturer.

1. Warranties must be standard and not job specific.

2. All styles must come from the same manufacturer.
3. Must be single source fiber extrusion and yarn manufacturing.

1.7 QUALIFICATIONS

A. Installer/Flooring Contractor Qualifications

1. Flooring Contractor to provide references at the request of the owner.

2. Carpet Contractor will be responsible for the proper product installation, including floor preparation and moisture control as required.

3. Carpet Contractor to provide owner a written warranty that guarantees the completed installation be free from defects in materials and workmanship for a period of two (2) years after job completion.

1.8 PRE-INSTALLATION MEETINGS

A. Convene one (1) week prior to commencing work of this section.

B. Require attendance of (manufacturer), (installer), (contractor), (owner), (architect) and other parties directly affecting the work of this section.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver carpet tile in sealed protective boxes and accessories in sealed containers. Segregate each carpet product (if several product styles are involved), according to style, color, pattern, dye lot, run number, and quantity.

B. Store products in an enclosed and dry area protected from damage and soiling.

1.10 SITE ENVIRONMENTAL REQUIREMENTS

A. Do not install carpet tile until all areas have been fully enclosed and the environmental conditions have reached the levels desired for occupancy of the space.

B. Maintain ambient temperature and humidity conditions during and after installation of carpet tile at occupancy levels.

C. Allow carpet to reach room temperature, or minimum temperature recommended by manufacturer prior to the start of the installation.

D. Protect adhesives from freezing. Follow manufacturer’s recommendations for minimum temperatures to which adhesives are exposed.

1.11 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings.

1.12 SEQUENCING

A. Sequence installation so as to minimize possibility of damage and soiling of carpet.

B. Do not commence installation until painting and finishing work are complete, and ceiling and overhead work have been tested, approved and completed.

C. Remove and replace existing carpet (renovations) in accordance with pre-approved architectural plan.

1.13 WARRANTY

Warranty Performance Requirements

A. Provide manufacturer's lifetime warranties for:
   1. Wear
   2. Static
   3. Edge Ravel
   4. Zippering
   5. Delamination
   6. Dimensional Stability

B. Supplemental Fiber Warranties:
   1. Lifetime Stain Warranty
   2. Lifetime Warranty against color transfer wet or dry
   3. Lifetime Warranty against wet fastness
   4. 10 Year Colorfastness to Light
   5. 10 Year Colorfastness to Atmospheric contaminants

1.14 EXTRA MATERIALS

A. Provide 3% percent overage of calculated yardage for each type of carpet (include carpet needed for complete installation plus waste and usable scraps in calculated yardage) as specified by architect and/or end user. Recycle waste, unusable scrap and any carpet tile damaged during installation through a qualified industry recycling or manufacturer environmental program.

B. Deliver specified attic stock requirements to Owner's designated storage space, properly packaged and identified.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. Mohawk Group, 160 S. Industrial Blvd, Calhoun GA Telephone 800.241.4494 Web Site: www.mohawkgroup.com.
   a. Contact: Nicole Holloway Cell: (619) 396-0788

B. Or approved Equal.

2.2 CARPET TILE CONSTRUCTION

A. All yarn and other carpet materials shall be manufacturer's first quality.

B. Carpet tile backing composite shall be constructed in the following manner:

C. Backing Material/Composition
Primary – Reinforced Synthetic – non woven
Secondary Backing Layer – Thermoplastic Polymer

D. Reference Carpet Tile Pattern Visualization Exhibit dated 8/3/2020 for additional information regarding carpet flooring pattern.

DETAILED PRODUCT CONSTRUCTION SPECIFICATIONS

CARPET # CPT-1 and CPT-2

Style Name:	Micro Bloom Tile 12BY36 GT397
Product Type:	Carpet Tile
Construction:	Tufted
Surface Texture:	Textured Patterned Loop
Gauge:	1/12 (47.00 rows per 10 cm)
Density:	9,509
Weight Density:	266,264
Stitches per Inch:	12.6 (49.61 per 10 cm)
Finished Pile Thickness:	.106" (2.69 mm)
Dye Method:	Solution Dyed
Backing Material:	EcoFlex NXT
Fiber Type:	Duracolor® Premium Nylon
Face Weight:	28 oz/yd2 (949 g/m2)
Size:	12" x 36" (.3048 m x .9144 m)
Soil Release Technology:	Sentry Soil Protection
Installation Method:	Monolithic, Monolithic Stepping, Plank Half Lap, Basket Weave, Half Lap, Brick Ashlar, Random, Herringbone
Indoor Air Quality:	CRI Green Label Plus GLP1171
Foot Traffic Recommendation TARR:	Heavy
NSF 140	EcoFlex NXT - NSF 140 Gold

CARPET # CPT-3

Style Name:	Macro Bloom Tile 12BY36 GT388
Product Type:	Carpet Tile
Construction:	Tufted
Surface Texture:	Textured Patterned Loop
Gauge:	1/12 (47.00 rows per 10 cm)
Density:	9,321
Weight Density:	270,231
Stitches per Inch:	12.6 (49.61 per 10 cm)
Finished Pile Thickness:	.112" (2.84 mm)
Dye Method:	Solution Dyed
Backing Material:	EcoFlex NXT
Fiber Type:	Duracolor® Premium Nylon

Face Weight:	29 oz/yd2 (983 g/m2)
Size:	12” x 36” (.3048 m x .9144 m)
Soil Release Technology:	Sentry Soil Protection
Installation Method:	Monolithic, Monolithic Stepping, Plank Half Lap, Basket Weave, Half Lap, Brick Ashlar, Random, Herringbone
Indoor Air Quality:	CRI Green Label Plus GLP1171
Foot Traffic Recommendation TARR:	Heavy
NSF 140	EcoFlex NXT - NSF 140 Gold

All specifications are subject to normal manufacturing tolerances

2.3 ENVIRONMENTAL ATTRIBUTES AND CRITERIA

A. Environmental claims by manufacturer must comply with FTC guidelines.

B. Low Emitting Materials – Carpet Tile. Carpet must pass the Carpet and Rug Institute Green Label Plus Program for VOC emissions.

C. Low Emitting Materials: Carpet Tile and all installation components, including adhesives, must meet the *Low Emitting Materials* standards as outlined in U.S. Green Building Council LEED criteria. Adhesives must meet VOC emissions standards per South Coast Air Quality Management District Rule #1168.

D. Installation adhesives must pass the CRI Green Label Plus equivalent protocol for VOC emissions.

E. Recycled Content: Carpet must contain 35% Post-consumer recycled content based on total product weight.

F. Carpet Face Yarn: In accordance with Executive Order 13101, carpet face yarn must contain minimum 25% pre-consumer Recycled content.

G. NSF/ANSI 140 – 2007e Gold Certified

2.4 ACCESSORIES

A. Leveling Compound: Latex type as recommended by carpet manufacturer; compatible with carpet adhesive and curling/sealing compound used on concrete.

B. Pressure Sensitive Adhesive: Low VOC EnPress® Pressure Sensitive Adhesive carpet tile adhesive, as recommended by carpet manufacturer for direct glue down of carpet tiles; comply with CRI Green Label Plus Certification Program.

C. Non-Metallic Carpet Edge Guard: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum two (2) inch wide anchorage flange; colors selected by (Architect) from manufacturer’s standard range of colors.

D. Miscellaneous Materials: As recommended by manufacturer of carpet, cushion, and other carpet products; as required to complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates for conditions under which carpet tiles are to be installed.

B. Verify that floor surfaces are smooth and flat within tolerances specified in Section 3.2 and are ready to receive work.

C. Beginning of installation means installer accepts existing substrate conditions.

3.2 PREPARATION

A. Allow new concrete to cure for 90 days before carpet installation starts.

B. Perform moisture content testing as required by manufacturer's instructions to ensure pH readings of no more than nine (9). Moisture transmission of 3.0-lbs/sq. ft per 24 hours is acceptable. If values exceed this level, follow manufacturer's recommendations for moisture transmission mitigation. Do not proceed until unsatisfactory conditions have been corrected.

C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes and other defects with sub-floor filler.

D. Fill, level and make smooth cracks 1/16 inch or more, holes, unevenness, and roughness with compatible latex floor patching compounds. Feather floor filling or leveling compound a minimum of four (4) ft. Sweep floor of loose granular debris prior to filling. After filling, allow filler to dry. Damp mop floor with warm water and allow to dry. Vacuum after mopping to ensure that loose granular debris is removed and to provide a proper substrate to install carpet tile. Prohibit traffic until filler is cured.

E. Vacuum floor again immediately before installation of carpeting.

F. Confirm compatibility of EnPress® Pressure Sensitive Adhesive with curing compounds on concrete floors.

G. Preheat areas to receive carpet tile to a minimum temperature of 68° F for 72 hours prior to installation, with a relative humidity of not more than 65 percent. Maintain minimum temperature of 50° F thereafter. Carpet tile and adhesive must be stored at a minimum temperature of 68° F, for 72 hours prior to installation.

H. Store EnPress® Pressure Sensitive Adhesive and other liquid materials in same atmospheric conditions as carpet tile, 68° F for at least 72 hours.

3.3 INSTALLATION

A. Install carpet tile in accordance with the Technical Bulletins provided by the manufacturer. These technical bulletins will offer the proper instructions to install carpet tile including: (1) conducting site testing and conditioning, (2) floor preparation, (3) installation of the carpet tile, including carpet tile layout (if more than one pattern or

color) and approved adhesives, systems, etc. As a supplement, the CRI 104, section 8 will supply additional installation support guidance for your installation.

B. Install carpet tile under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets in each space.

C. Conceal cut edges with protective edge guards or flanges.

D. Install carpet tile under open-bottom items and cut tiles tight against walls, columns, and cabinets so that the entire floor area is covered with carpet tile. Cover over floor-type door closers.

E. Install edging guards at openings and doors wherever the carpet tile terminates, unless indicated otherwise.

F. Perform cutting in accordance with manufacturer's recommendation using tools designed for carpet tile being installed. Verify carpet tile patterns and colors before cutting to insure minimal variation between dye lots.

G. Install carpet tile according to manufacturer's instructions. Depending on the product specification, install either monolithically, quarter turned, Ashlar, or random. Installation requirements will be spelled out in the architectural drawings for the recommended method to be employed.

H. Use leveling compound where necessary. Feather floor leveling compounds minimum of 4 ft.

I. Trim carpet tile neatly at walls, and around interruptions

J. Complete installation of edge strips, concealing exposed edges.

K. Cut carpet tile at fixtures, architectural elements, and perimeters.

L. Install carpet on stairs using acceptable permanent adhesive. Furnish and use compatible edge strip and nosing products as required.

3.4 FIELD QUALITY CONTROL

A. Inspect completed carpet tile installation on each floor.

B. Verify that installation is complete; work is properly done and acceptable.

C. Remove and replace, at no additional cost to owner, any work found not to be acceptable.

3.5 CLEANING

A. On completion of installation in each area, remove dirt and scraps from surface of finished carpet tile. Clean soiling, spots, or excess adhesive on carpet with cleaning materials recommended by carpet manufacturer.

B. Remove debris; sort pieces from carpet scraps.

C. At completion of work, vacuum carpet using commercial vacuuming equipment as recommended by manufacturer. Remove spots and replace carpet tile where spots cannot be removed. Remove rejected carpet tile pieces and replace with new modules. Remove any protruding yarns with shears or sharp scissors.

3.6 PROTECTION

A. Do not permit traffic over unprotected carpet surface.

B. Protect carpet tile against damage during construction. Cover with 6-mil thick polyethylene during construction period so that carpet will be without soiling, deterioration, wear, or damage at time of completion.

C. Prior to furniture move in, heavy traffic areas will be protected with additional Masonite sheets to protect the carpet from damage.

D. Damaged carpet tile will be rejected. As carpet tile is installed, remove trimmings, scraps of carpet and installation materials.

E. Maintain protection of carpeting on each floor or area until work is accepted.

END OF SECTION 09 68 13

SECTION 09 77 20

FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard.
   1. [PVC] trim.

1.2 RELATED SECTIONS

A. Section 09 29 00 Gypsum substrate board.

1.3 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM)
   1. ASTM D 256 - Izod Impact Strengths (ft #/in)
   2. ASTM D 570 - Water Absorption (%)
   3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
   4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
   5. ASTM D 2583- Barcol Hardness
   6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings: Submit accurately scaled, CAD drawn elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer’s standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
   1. Submit complete with specified applied finish.

2. For selected patterns show complete pattern repeat.
3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants and other pertinent materials prior to their delivery to the site.

1.5 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
a. Wall Required Rating – Class A.

B. Sanitary Standards: System components and finishes to comply with:
1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
2. County of San Diego Department of Environmental Health

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.8 WARRANTY

A. Furnish one year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite; 1 Marlite Drive, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com.

B. Product:
   1. Standard FRP

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
   1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
   2. Dimensions:
      a. Thickness – 0.090 “ (2.29mm) nominal
      b. Width - 4'-0” (1.22m) nominal
      c. Length – [10’-0” (3.0m)][8’-0” (2.4m)][As indicated on the drawings] nominal
   3. Tolerance:
      a. Length and Width: +/-1/8 “ (3.175mm)
      b. Square - Not to exceed 1/8 “ for 8 foot (2.4m) panels or 5/32 “ (3.96mm) for 10 foot (2.4m) panels

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   1. Flexural Strength - 1.0 x 10^4 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
   2. Flexural Modulus - 3.1 x 10^5 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
   3. Tensile Strength - 7.0 x 10^3 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
   4. Tensile Modulus - 1.6 x 10^5 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
   5. Water Absorption - 0.72% per ASTM D 570.
   6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
   7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Finish:
   a. Color: To be selected from manufacturers standard colors.
   b. Surface To be selected from manufacturers standard finish options.
   c. Fire Rating: Class A (I) Fire Rating.
   d. Size: Supply in standard sizes.

2.3 MOLDINGS

A. Provide closure trim at all panel edges and as recommended by manufacturer.

B. PVC Trim: Thin-wall semi-rigid extruded PVC.
   1. Color: to match selected panel color.

2.4 ACCESSRIES

A. Fasteners: Non-staining nylon drive rivets.

1. Match panel colors.
2. Length to suit project conditions.

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive.
2. Marlite C-915 Construction Adhesive - Flexible, water-resistant, solvent based adhesive, formulated for fast, easy application.
3. Titebond Advanced Polymer Panel Adhesive – VOC compliant, non-flammable, environmentally safe adhesive.

C. Sealant:
1. Marlite Brand - Color Match Sealant.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
1. Verify that stud spacing does not exceed 24” (61cm) on-center.

B. Repair defects prior to installation.
1. Level wall surfaces to panel manufacturer’s requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Apply panels vertically oriented, full height. Layout panels to reduce vertical seams.

C. Cut sheets to meet supports allowing 1/8” (3 mm) clearance for every 8 foot (2.4m) of panel.
1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
2. Pre-drill fastener holes 1/8” (3mm) oversize with high speed drill bit.
   a. Space at 8” (200mm) maximum on center at perimeter, approximately 1” from panel edge.
   b. Space at in field in rows 16’ (40.64cm) on center, with fasteners spaced at 12” (30.48 cm) maximum on center.

D. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
1. Install panels with manufacturer's recommended gap for panel field and corner joints.
   a. Adhesive trowel and application method to conform to adhesive manufacturer’s recommendations.
   b. Drive fasteners for snug fit. Do not over-tighten.

E. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
   1. All moldings must provide for a minimum 1/8 “ (3mm) of panel expansion at joints and edges, to insure proper installation.
   2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION 09 77 20

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

2. Materials to be Stained or Painted:
   a. Gypsum Board Walls and Ceilings
   b. Exposed Interior Metal Work that is not galvanized or otherwise coated.
   c. Exterior Wood Framing and Finish Work
   d. Interior Wood Finish work

B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, exposed concrete surfaces, operating parts, and labels.

1. Prefinished items may include the following factory-finished components:
   a. Finished mechanical and electrical equipment.
   b. Light fixtures.
   c. Pre-finished door hardware not noted as requiring paint finish.
   d. Metal Roofing.
   e. Metal Siding.
   f. Metal Flashings.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

   a. Foundation spaces.
   b. Furred areas.
   c. Ceiling plenums.
   d. Utility tunnels.
   e. Pipe spaces.
   f. Duct shafts.

3. Finished metal surfaces include the following:

   a. Anodized aluminum.
   b. Stainless steel not noted as “painted”
   c. Chromium plate.
   d. Copper and copper alloys.
   e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

    a. Valve and damper operators.
    b. Linkages.
    c. Sensing devices.
    d. Motor and fan shafts.
    e. Door Hardware.

5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

C. Related Sections include the following:
1. Division 5 Section "Structural Steel" for shop priming structural steel.
2. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
3. Division 8 Section "Metal Doors and Frames" for factory priming steel doors and frames.
4. Division 9 Section "High-Performance Coatings" for industrial paints and maintenance and for special coatings.

D. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's statement that components are appropriate to each painting system.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Initial Selection: For each type of finish-coat material indicated.

1. After color selection, Owner's Representative will furnish color chips for surfaces to be coated.

C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit Samples on the following substrates for Architects review of color and texture only:

a. Color Samples: 8-1/2 by 11inch card of each color for approval prior to commencing work. Samples shall be for color approval only, not texture or finish. Submit in sufficient time to avoid delaying progress of work.

1.4 STANDARD OF QUALITY: The products specified and manufactured are to conform to the Paint Specifications when indicated,and shall be considered as the minimum acceptable standard of quality.

1.5 QUALITY ASSURANCE

A. All painting and coating materials shall meet or exceed the EPA and/or California State environmental regulations, whichever is more restrictive, for the maximum allowable amount VOC content.

B. Statement of Application: Upon completion, submit written statement signed by the Contractor, his applicator and the manufacturer, stating that painting systems complied with the specifications, and the application methods complied with manufacturer's printed instructions and were proper and adequate for conditions of application and performance.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1. Owner's Representative will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.

a. Wall Surfaces: Provide samples on at least 100 sq. ft. of wall.
b. Small Areas and Items: Owner's Representative will designate items or areas required.

2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.

a. After finishes are accepted, Owner's Representative will use the room or surface to evaluate coating systems of a similar nature.

3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.

1. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: Furnish Owner with extra paint materials in quantities indicated below:
a. Interior, Flat Acrylic Paint: 1 gal. of each color applied.

b. Interior, Low-Luster Acrylic Finish: 1 gal. of each color applied.
c. Interior, Semigloss Acrylic Enamel: 1 gal. of each color applied.
d. Interior, Full-Gloss Alkyd Enamel: 1 gal. of each color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: in other Part 2 articles.
1. Frazee Paint Company (Frazee) or
2. ICI Dulux Paints
3. Dunn Edwards
4. Sherwin-Williams Co. (Sherwin-Williams)
5. Vista Paint Corporation. (Vista Paints).
6. Or equal.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's premium-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Match Reference Products outlined in Section 3.8 Paint Schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Owner's Representative about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

3. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touchup painted.
3. Two finish coats over a primer are specified. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel

sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:

1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.

2. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Owners Representative.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 PAINT SCHEDULE

A. Basis of Design: Sherwin Williams products are indicated in this Article 3.8 to establish the level of quality. Equivalent first line architectural coatings matching the level of quality indicated, must be approved by the Owner prior to their use.

B. Gypsum Board: Provide the following finish systems over finished gypsum board:

1. Flat Acrylic Finish: Two finish coats over a primer.

Primer:a. SW ProMar 200 Zero VOC Primer, B28W2600 @ 1 mil DFT per coat

Two Coats: a. SW ProMar 200 Zero VOC Flat, B30-2600 @ 1.6 mils DFT per coat

2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.

Primer: a. SW ProMar 200 Zero VOC Primer, B28W2600 @ 1 mil DFT per coat

Two Coats: a. SW ProMar 200 Zero VOC Low Gloss Eg-shel, B41-2600 @ 1.6 mils DFT per coat

3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.

Primer: a. SW ProMar 200 Zero VOC Primer, B28W2600 @ 1 mil DFT per coat

Two Coats: a. SW ProMar 200 Zero VOC Semigloss, B31-2600 @ 1.6 mils DFT per coat

4. Full-Gloss Acrylic-Enamel Finish: Two finish coats over a primer.

Primer: a. SW ProMar 200 Zero VOC Primer, B28W2600 @ 1 mil DFT per coat

Two Coats: a. SW ProMar 200 Zero VOC Gloss, B21-12651 @ 1.6 mils DFT per coat

C. Interior Wood Work: Provide the following waterbourne Satin Semi-Transparent Stain

1. Waterbourne Semi-Transparent Stain:
   a. Two Coats: SW Superdeck Log Home & Deck Stain
   b. Stain to meet third party testing requirements per CDPH Standard Method V1.1
   c. Color as chosen by architect from manufactures full line.

D. Interior Metal Fabrications (Conditioned Spaces)

1. Low-Luster Waterbased Light Industrial Finish: Two finish coats over a primer.

   Primer: a. SW ProCryl Acrylic Metal Primer, B66-310, applied at 1.8 – 3.6 mils DFT

   Two Coats: a. SW ProIndustrial Waterbased Alkyd Urethane Low Sheen, B53-1250 @ 1.7 mils DFT per coat

2. Semigloss Waterbased Light Industrial Finish: Two finish coats over a primer.

   Primer: a. SW ProCryl Acrylic Metal Primer, B66-310, applied at 1.8 – 3.6 mils DFT

   Two Coats: a. SW ProIndustrial Waterbased Alkyd Urethane Semigloss, B53-1150 @ 1.7 mils DFT per coat

3. Gloss Waterbased Light Industrial Finish: Two finish coats over a primer.
   Primer: a. SW ProCryl Acrylic Metal Primer, B66-310, applied at 1.8 – 3.6 mils DFT

   Two Coats: a. SW ProIndustrial Waterbased Alkyd Urethane Gloss, B53-1050 @ 1.7 mils DFT per coat

F. Metal Fabrications (Non-conditioned Spaces)

1. Reference Section 09 96 00 “High performance Coatings” for finish of Metal Surfaces exposed to exterior elements (non-conditioned spaces).

3.8 PAINT COLOR SCHEDULE

1. Paint colors listed below are for reference as Basis of Design. Submitted paint samples must match color and finish listed in Paint Color Schedule, utilizing the approved paint products listed in this specification section.

BUILDING INTERIORS:

1. Colors as indicated on Finish Schedule A701and as selected by Architect.

BUILDING EXTERIORS:

1. Colors as indicated Architectural Elevation A201-A203 and as selected by Architect.

END OF SECTION 09 90 00

SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field application of high-performance coating systems to the following items and surfaces: Exterior metals not pre-finished with fluoropolymer finish or other shop applied finishes specified. Exterior Scope includes, but may not be limited to Metal Doors and Frames, Structural Steel, Steel Decking, Metal Stairs, Miscellaneous Metals, and all other metals exposed to view and subject to exterior environmental conditions.

B. Interior paint finishes shall be as specified in Section 09 90 00 “Painting”.

C. Color: as indicated in Paint Schedule in Section 09 90 00 “Painting”.

1.2 DEFINITIONS

A. Standard coating terms defined in ASTM D 16 apply to this Section.

B. Gloss ranges used in this Section include the following:

1. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
2. High gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

C. Environments: The following terms are used in Part 2 of this Section to distinguish between different corrosive exposures:

1. "Severe environments" are highly corrosive industrial atmospheres with sustained exposure to high humidity and condensation and with frequent cleaning using strong chemicals. Environments with heavy concentrations of strong chemical fumes and frequent splashing and spilling of harsh chemical products are severe environments.
2. "Moderate environments" are corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, and regular cleaning with strong chemicals. Environments with exposure to heavy concentrations of chemical fumes and occasional splashing and spilling of chemical products are moderate environments.
3. "Mild environments" are industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew development, and infrequent cleaning with strong chemicals. Environments with low levels of mild chemical fumes and occasional splashing and spilling of chemical products are mild environments. Normal outdoor weathering is also considered a mild environment.

1.3 SUBMITTALS

A. Product Data: For each coating system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material specified.

B. Certification by manufacturer that products supplied comply with requirements indicated that limit the amount of VOCs in coating products.

C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

1. Provide stepped Samples defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. List of material and application for each coat of each sample. Label each sample for location and application.
3. Submit samples on the following substrates for Architect’s review of color and texture:

a. Ferrous and Nonferrous Metal: Provide two 6 inch square samples of flat metal and two 12 inch long samples of solid metal for each color and finish.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

B. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1. Applicator shall identify sections of metal components to be used as Benchmark Sample areas, for Architects approval. Areas shall include surfaces in full sun and shade, flat surfaces and shaped surfaces to demonstrate a full range of eild conditions.

2. Final approval of colors will be based upon benchmark samples. Benchmark samples will become the basis for comparison and approval of all other applications.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the following information:

1. Name or title of material.
2. Product description (generic classification or binder type).

3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. Handling instructions and precautions.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying coatings.

1.6 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between (7 and 35 deg C).

B. Do not apply coatings in rain, fog, or mist; when relative humidity exceeds 85 percent; at; or to damp or wet surfaces.

1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.
2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.

1.7 EXTRA MATERIALS

A. Furnish extra high-performance coating materials from the same production run as materials applied and in quantities described below. Package coating materials in unopened, factory-sealed containers for storage and identify with labels describing contents.

B. Note: prior to providing extra materials, review and verify quantities with owner.

1. Quantity: Furnish extra coating materials in quantities indicated below:

a. High-Gloss, Aliphatic Polyurethane Enamel: 1 gal. of each color applied.
b. Semigloss, Aliphatic Polyurethane Enamel: 1 gal. of each color applied.
c. High-Gloss, Waterborne, Acrylic Enamel: 1 gal of each color applied.
d. Semigloss, Waterborne, Acrylic Enamel: 1 gal of each color applied.
e. High-Gloss, Polyamide Epoxy Coatings: 1 gal of each color applied.
f. Semigloss, Polyamide Epoxy Coatings: 1 gal of each color applied.

2. Quantity: Furnish an additional 5 percent, but not less than 1 gal., as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

B. Products: Subject to compliance with requirements, provide one of the products indicated in the coating system descriptions.

C. Manufacturers' Names: The following manufacturers are referred to in the coating system descriptions by shortened versions of their names shown in parenthesis:

1. DuPont Company, High Performance Coatings (DuPont).
2. ICI Dulux Paints; Devoe Coatings (ICI).
3. International Protective Coatings; Courtaulds Coatings (International).
4. Moore: Benjamin Moore & Co. (Moore).
5. Pittsburgh Paint; PPG Industries, Inc. (PPG).
6. Rust-Oleum Corporation (R-O).
7. Sherwin Williams; Industrial and Marine Coatings (S-W).

2.2 COATINGS MATERIALS, GENERAL

A. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's highest grade of the various high-performance coatings specified. Materials not displaying manufacturer's product identification are not acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 250 g/L or less.

2.3 COLORS

A. Colors: As indicated, and as described in Section 09 90 00 “Painting”.

2.4 EXTERIOR HIGH-PERFORMANCE COATING SYSTEMS

A. Ferrous Metal: Provide the following finish systems over exterior structural ferrous-metal surfaces. Sherwin Williams products are indicated in this section to establish the level of quality. Equivalent first line architectural coatings matching the level of quality indicated, must be approved by the Owner prior to their use:

1. Moderate Environment (High-Gloss Finish): One finish coat over an intermediate coat and a primer.

   a. Primer: Epoxy primer applied at spreading rate recommended by manufacturer.

      1) S-W: Macropoxy 646 Fast Cure, B58 Series @ 5-10 mils DFT

   b. Intermediate Coat: Waterbased Acrylic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.038 to 0.102 mm).

      1) SW: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT

   d. Topcoat: Waterbased Acrylic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.038 to 0.102 mm).

      1) S-W: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT

B. Nonferrous Metal: Provide the following finish systems over exterior structural nonferrous-metal surfaces:

   1. Moderate Environment (High-Gloss Finish): One finish coat over an intermediate coat and a primer.

      a. Primer: Epoxy primer applied at spreading rate recommended by manufacturer.

         1) S-W: Macropoxy 646 Fast Cure, B58 Series @ 5-10 mils DFT.

      b. Intermediate Coat: Watewrbased Acrylic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.038 to 0.102 mm).

         1) S-W: SW: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

      d. Topcoat: Waterbased Acrylic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.038 to 0.102 mm).

         1) S-W: SW: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

C. Ferrous Metal: Provide the following finish systems over exterior ferrous-metal steel and welded wire fence and gate assemblies.

1. Powder Coating: Tiger Drylac 38 with primer- 2 coat system. Pretreat according to AAMA 2604; to withstand a minimum of 3000hrs. ASTM B117 or 700hrs ASTM G85 Annex A2. Apply TIGER 60/70000 at minimum of 2.0 mils 50% or less cure to ensure proper inter coat adhesion to topcoat. Apply TIGER Series 38 AAMA 2604 compliant topcoat at a minimum of 2.5 mils and process according to supplier's recommendations.

2. Color to match:
   a. Manufacturer: Benjamin Moore & Co.
   b. Color: #2130-30 Iron Mountain

3. Texture: Smooth Texture Glossy

2.5 EXTERIOR HIGH-PERFORMANCE COATING SYSTEMS

A. Ferrous Metal: Provide the following finish systems over exterior / interior ferrous-metal doors, frames, flashings, and miscellaneous metal that is not prefinished:

1. Moderate Environment (High-Gloss Finish): One finish coat over an intermediate coat and a primer.

   a. Primer: Acrylic primer, as recommended by manufacturer for this substrate, applied at spreading rate recommended by manufacturer.

      1) S-W: ProCryl Acrylic Metal Primer, B66-310 @ 2-4 mils DFT

   b. Intermediate Coat: Waterbased Acrylic Urethane applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.025 to 0.102 mm).

      1) SW: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

   c. Topcoat: Waterbased Acrylic High-gloss urethane applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.025 to 0.102 mm), unless otherwise indicated.

      1) S-W: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

      Ferrous Metal: Provide the following finish systems over exterior / interior ferrous-metal doors, frames, flashings, and miscellaneous metal that is not prefinished:

B. Nonferrous Metal: Provide the following finish systems over exterior/ interior nonferrous-metal doors, frames, flashings and miscellaneous metal that is not prefinished:

1. Moderate Environment (High-Gloss Finish): One finish coat over an intermediate coat and a primer.

a. Primer: Acrylic primer, as recommended by manufacturer for this substrate, applied at spreading rate recommended by manufacturer.

1) S-W: ProCryl Acrylic Metal Primer, B66-310 @ 2-4 mils DFT.

b. Intermediate Coat: Waterbased Acrylic Urethane applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.025 to 0.102 mm).

1) S-W: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

c. Topcoat: Waterbased Acrylic High-gloss urethane applied at spreading rate recommended by manufacturer to achieve a dry film thickness of (0.025 to 0.102 mm).

1) 8) S-W: Acrolon 100 WB Urethane, B65 Series @ 3-4 mils DFT.

C. Exterior Plaster: Provide the following finish system over exterior plaster finish surfaces:

1. Exterior (High) Building Coating System

a. Basis of Design: Sherwin Williams Loxon XP Waterproofing Coating – Flat or approved equal.

b. Color: As indicated on the paint schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. With Applicator present, examine substrates and conditions under which high-performance coatings will be applied, for compliance with coating application requirements.

1. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
2. Start of application is construed as Applicator's acceptance of surfaces within that particular area.

B. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.

1. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:

    a. Confirmation of primer's suitability for expected service conditions.
    b. Confirmation of primer's ability to be top coated with materials specified.

2. Notify Architect about anticipated problems before using the coatings specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

B. Cleaning: Before applying high-performance coatings, clean substrates of substances that could impair bond of coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and coating application so dust and other contaminates from cleaning process will not fall on wet, newly coated surfaces.

C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
2. Ferrous-Metal Substrates: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.

    a. Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10/NACE No. 2.
    b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
    c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.

5. Nonferrous-Metal Substrates: Per SSPC-SP1, Clean nonferrous and galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required.

    a. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
3. Use only the type of thinners approved by manufacturer and only within recommended limits.

E. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply high-performance coatings according to manufacturer's written instructions.

1. Use applicators and techniques best suited for the material being applied.
2. Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
3. Coating colors, surface treatments, and finishes are indicated in the coating system descriptions.
4. Provide finish coats compatible with primers used.
5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, louvers, grilles, covers and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

    a. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
    b. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required is the same regardless of application method.

    a. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
    b. Where manufacturer's written instructions require sanding, sand between applications to produce a smooth, even surface.
    c. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat does not cause undercoat to lift or lose adhesion.

2. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance. Give special attention to

edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.

C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brush Application: Use brushes best suited for material applied and of appropriate size for the surface or item being coated.

   a. Apply primers and first coats by brush unless manufacturer's written instructions permit using roller or mechanical applicators.
   b. Brush out and work brush coats into surfaces in an even film.
   c. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for the material and texture required.
3. Spray Equipment: Use mechanical methods to apply coating if permitted by manufacturer's written instructions and governing regulations.

   a. Use spray equipment with orifice size recommended by manufacturer for material and texture required.
   b. Apply each coat to provide the equivalent hiding of brush-applied coats.
   c. Do not double back with spray equipment building-up film thickness of two coats in one pass, unless recommended by manufacturer.

D. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.

1. Recoat primed and sealed substrates if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.

F. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following procedure at any time and as often as University deems necessary during the period when coatings are being applied:

1. Owner will engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will perform appropriate tests for the following characteristics as required by Owner:

    a. Quantitative materials analysis.
    b. Absorption.
    c. Accelerated weathering.
    d. Accelerated yellowness.
    e. Color retention.
    f. Alkali and mildew resistance.
    g. Abrasion resistance.
    h. Apparent reflectivity.
    i. Washability.
    j. Dry opacity.
    k. Recoating.
    l. Skinning.

3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. If necessary, Contractor may be required to remove rejected materials from previously coated surfaces if, on recoating with specified materials, the two coatings are not compatible.

3.5 CLEANING

A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Owner and Architect, and leave in an undamaged condition.

1. Provide "Wet Paint" signs to protect newly coated finishes. After completing coating operations, remove temporary protective wrappings provided by others to protect their work.
2. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION 09 96 00

SECTION 10 14 02

EXTERIOR SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Provide project exterior signage including:

1. Sign Type 5: Accessible Parking Information
2. Sign Type 6: Accessible Parking Identification
3. Sign Type 10: Decorative Signage
4. Sign Type 11: Dimensional Letters
5. Sign Type 12: Decorative Signage
6. Sign Type 13: Information - Copy on Glass

B. Related Requirements:

1. Section 101404 “Interior Signage.”

1.3 REFERENCES

A. ADA/ADAAG/SAD – Standards for Accessible Design.

B. American Society for Testing and Materials (ASTM):

1. ASTM A 500/A 500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. American Welding Society (AWS):

1. AWS D1.1: Structural Welding Code – Steel.
2. AWS D1.2: Structural Welding Code – Aluminum.

D. California Public Safety Codes – Title 19.

E. California Title 24.

F. Green Seal Standard GS 11 “Paints and Coatings.”

G. International Building Code (IBC 2012), unless instructed to use or reference an earlier IBC dated code by the Project Architect.

H. California Building Code (CBC 2013)

I. National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual.”

J. National Electrical Code (NEC).

K. California Electric Code (CEC).

L. National Fire Protection Association (NFPA).

M. Office of Statewide Health Planning and Development (OSHPD) – Seismic and Life Safety Standards specific to California.

N. South Coast Air Quality Management District (SCAQMD):

1. Rule #1168 “Adhesive and Sealant Applications”.

O. Underwriters Laboratories (UL):

1. UL Standard 48 – Signs.
2. UL Standard 1570 – Fixtures.

P. U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED).

1.4 COORDINATION

A. Furnish templates, made from rigid material, and tolerance information, for placement of sign-anchorage devices embedded in permanent construction by other installers.

1. Clearly mark with “Side A/Side B” reference and include directional marking denoting “North.”

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers. Include Data cable/s and any shielding or conduit (as required) for the installation of LED or LCD Monitors /Displays.

1.5 ACTION SUBMITTALS

A. General: Except as otherwise indicated, comply with requirements of Section 013300 “Submittal Procedures.”

B. Product Data: For each type of product.

1. Include fabrication details, material descriptions, overall dimensions, and dimensions of individual components.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include product data for paint, coatings, and other finish materials as required to show compliance with specified requirements.

C. Material Data:

1. Submit material cost data for materials required to construct Work in place. Material cost shall reflect actual cost of material without Contractor mark-up.
2. Provide manufacturer's information/data sheet or letter from manufacturer indicating location of manufacture, amount of recycled content (post consumer and industrial percentage in product), and location of raw material harvest if within 500 miles of Project site.
3. If requested by Owner, submit manufacturer's Material Safety Data Sheet (MSDS) directly to Owner.

D. Shop Drawings: Provide one set of reproducible Shop Drawings in electronic Acrobat PDF format and as paper print set, drawn to scale, detailing sign fabrication and installation. Provide DVD with electronic copy of Shop Drawings.

1. Include fabrication and installation details relating to attachments to other work.
2. Show sign mounting in plan and elevation; show supplementary supports and accessories to be provided by others clearly identified on shop drawings.
3. Provide printed-paper copy layout of each sign type, not less than 1/2 size.
4. Show locations of electrical service connections.
5. Include schematic diagrams of electrical circuitry and components.
6. Schedule and describe anchorage assemblies and their related components.
7. Show location of inserts for anchors and supports, which are to be attached to structure or built into concrete or masonry, if any.
8. Support and Backing in Walls: Sign Contractor with the assistance of the General Contractor, shall provide engineered Sign supports anchored to the building's structure where required and to meet applicable sign code requirements. Installations requiring support or backing, within the building wall construction, shall be immediately relayed to the Architect of Record and Construction Manager's Representative for field coordination. Location plans and the dimension on the design drawings are to be utilized for typical placement of each sign type. Should any obstructions prohibit installing the signs in any given location, the General Contractor shall be notified immediately and the GC and architect shall provide an alternate location as required.
9. Shop Drawings shall be new drawings prepared specifically for Project.

    a. Re-submittal of issued Drawings with title block modifications are not acceptable.

E. Engineering Drawings: Sealed and signed by Professional Engineer responsible for preparation of engineering analysis who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices. Engineering Drawings include, but are not limited to:

1. Plans, elevations, sections, and details for fabrication and installation of sign structures and foundations indicating sizes, dimensions, and profiles; arrangement and provisions for jointing, supporting, anchoring, and fastening.

2. Include details showing relationship with, attachment to, and reception of related Work.

a. Indicate details of adjoining Work, even though not included in Work of this Section, to ensure coordination of Work and Work of other Sections.
b. Reference Architect detail numbers where applicable.

F. Engineering Analysis: Sealed and signed by Professional Engineer who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices.

G. Samples:

1. Paints and Coatings:

a. Color Samples: Submit 2 samples of each color, sheen, and texture of paint finish on minimum 4 by 6 inch aluminum sheets to simulate actual finish. Resubmit each sample as requested until required color, sheen, and texture are achieved.
b. Technical Specifications: Submit 2 copies of technical specifications of paint, coatings, and other finish materials.

2. Lettering Patterns: Submit 2 full-size lettering patterns of sign messages, symbols, or other graphic elements related to sign fabrication.
3. High Performance Graphic Film Copy: Submit 2 mounted, one-line samples of each size, color, typestyle, and font on pre-spaced tapes.
4. Screen Processed Copy: Submit 2 blue-line prints of film positives.
5. Hardware Samples: Submit 2 samples each of hardware such as hinges, locks, and fasteners that will be exposed to view.
6. Concrete Finish Samples: Provide 2 samples each, 6x6, demonstrating surface texture and color treatment (surface stain or integral color mix) as specified.

H. Mockup: Submit mockup to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. Submit 1 mockup of each of following:

a. Sign Type 10: Portion of Decorative Signage.
b. Sign Type 12: Mock-up of Sign Panel.

2. Subsequent fabrication shall conform to accepted mockups.
3. Approval of mockups does not constitute approval of deviations from Contract Documents unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of completed Work if undisturbed at time of Substantial Completion.

I. Product Schedule: For exterior signage. Use same designations indicated on Drawings.

J. Delegated-Design Submittal: For exterior signage indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Manufacturer.

B. Welding Certificates.

C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For exterior signage to include in emergency, operation, and maintenance manuals.

B. Record Submittals (As-Builts): Prepare and submit final record drawings, specifications, and current status documents for signs provided as Work of this Section.

1. Comply with requirements of Section 017839, except as otherwise indicated.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from same product run, that match products installed, that are packaged with protective covering for storage, and identified with labels describing contents.

1. Provide extra stock of following:

a. Furnish 1 gallon of each finish paint color for touch-up purposes. Include information on each paint manufacturer and order code numbers.
b. Provide 6 tools for each tamperproof fastener type used.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm regularly engaged in manufacture of exterior signage similar to products specified for this Project.

1. Contractor shall identify their proposed Project Management team, and provide resume for each team member that will be assigned to project, as well as an Organizational chart.
2. Contractor shall develop a fabrication and installation project schedule.
3. Contractor shall demonstrate capability for creating project database with customer/client accessibility, based upon receipt of NTP, outlining durations for submittals, submittal reviews, fabrication, installation, and completion.

B. Installer Qualifications: Manufacturer or an entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Welding Qualifications: Qualify procedures and personnel for both field and shop/production facility according to AWS D1.1/D1.1M, "Structural Welding Code – Steel" D1.2/D1.2M, "Structural Welding Code – Aluminum" D1.3, "Structural Welding Code - Sheet Steel" D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

D. Professional Engineer Qualifications: A professional structural engineer who is legally qualified to practice in jurisdiction where Project is located and who is capable in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with sign fabricator's / manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Submit detailed description of crating methods and materials used for shipment of large scale, fabricated signs or letters to Project team for review and approval prior to actual crating and shipping. Secure finished signage components within crate and protect from shipping or weather-related damage.

C. Deliver to jobsite in sign fabricator's / manufacturer's original unopened and undamaged packaging with identification labels intact.

D. Store in lockable, clean, dry area protected from weather, temperature, and other harmful conditions in accordance with sign fabricator's / manufacturer's written instructions.

E. Handle products in accordance with manufacturer's written instructions.

1.11 FIELD CONDITIONS

A. Field Measurements:

1. Inspect existing conditions and verify dimensions related to fabrication and installation of exterior signage prior to production.
2. Verify locations of anchorage devices and electrical services provided for signage installation embedded in permanent construction by other installers by field measurements before fabrication.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in function, materials, or workmanship within specified warranty period.

1. Failures include, but are not limited to following, as applicable to each sign type:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.
d. Mounting failure.
e. Structural failure.

2. Warranty Period: One (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturer's offering products that may be incorporated into Work include, but are not limited to:

1. 3M.
2. Akzo Nobel.
3. APCO Graphic, Inc.
4. Arlon Graphics, LLC.
5. ASI Sign Systems, Inc.
6. Matthews Paint Co.
7. Sign Comp.
8. Sign Systems.
9. Zumar Industries, Inc.

2.2 FABRICATORS

A. Fabricators: Subject to compliance with requirements, available fabricators approved for fabricating signage components and assemblies specified in this Section include, but are not limited to:

1. AD/S Design & Signs.
2. CNP / California Neon Products.
3. Encore Image.
4. Karman.
5. National Sign and Marketing Corporation.
6. Neiman & Company.
7. Sign Designers.
8. Sign Industries.
9. T Graphics.

2.3 SYSTEM DESCRIPTION

A. Frame and Enclosure:

1. Design, fabricate and install structural and non-structural support framing in accordance with requirements of authorities having jurisdiction.
2. Design to provide for movement of components without damage, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
3. Design system to accommodate construction tolerances, deflection of structural members, and clearances of intended openings of associated structures.
4. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with requirements of authorities having jurisdiction for seismic zone #4.
5. Design exterior signage to withstand positive and negative wind loads calculated in accordance with requirements of authorities having jurisdiction.

2.4 PERFORMANCE REQUIREMENTS

A. Design Rights: Sign Fabricator is hereby granted limited right to designs as indicated on Design Drawings and specified in this Section for sole purpose of completing contractual obligations to fabricate and install Project signage. Sign Fabricator may not manufacture, reproduce, or exhibit designs or modify designs for any other purpose without prior written consent.

B. Substitutions: No substitutions to fabrication process or material selections allowed unless approved by Architect/Designer in writing prior to fabrication.

C. Sign Fabricator's Responsibilities:

1. Provide labor, materials, and products required to fabricate and install exterior signage and graphic items detailed, noted, or specified in Contract Documents.
2. Obtain and pay for required permits and taxes.
3. Provide engineering design as required for approvals and permits.
4. Provide typographic copy layouts and other finished artwork, unless otherwise specified.
5. Provide for Union Labor (where required) for installation of finished signage.
6. Provide sufficient support and coordination throughout following phases:

    a. Submittal of shop drawings.
    b. On-site field surveys.
    c. Signage Fabrication.
    d. In-shop design milestone reviews.
    e. RFI process.
    f. Coordination of shipping/delivery of finished signage to job site.
    g. Final Installation.
    h. Participation in final punch-list walk.
    i. Correction of any identified deficiencies noted by project Design team and/or Client.

D. Delegated Design:

1. Engage a qualified Professional Engineer as defined in this Section to design sign structure and anchorage.

    a. Provide complete engineering drawings and calculations sealed and signed by responsible engineer.
    b. Provide engineering design as required for approvals and permits.

E. Accessibility Standard: Comply with CBC 2013 11B applicable provisions in U.S. Architectural & Transportation Barriers Compliance Board's ADA/ADAAG Accessibility Guidelines for Buildings and Facilities, SAD (Standards for Accessible Design), and ICC A117.1 for signs.

2.5 MATERIALS

A. Acrylic Polyurethane Paint:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

    a. AKZO Nobel.
    b. Matthews Paint Co.
    c. PPG.

2. General: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
3. Paint systems/products must be either Ultra Low VOC or Low VOC compliant.

B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Evonite Cyro, LLC: Acrylite.
b. Rohm and Haas: Plexiglas.
c. Or approved equal

C. Adhesives:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Dow Corning.
b. General Electric
c. Lord Adhesive.
d. Or approved equal

D. Anti-Graffiti Aerosol Spray Coating:

1. Basis of Design Product: Subject to compliance with requirements, provide Low VOC Satin Clear, Low VOC Gloss Clear, Low VOC Braco Clear (for decorative metals), or Low VOC Super Satin Clear/Anti Graffiti as manufactured by Mathews Paint Co. or product by following meeting or exceeding performance requirements of Basis of Design product:

a. Spraylat.
b. Or approved equal.

E. Anti-Graffiti Protective Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal Matte Overlaminate 3642 GPS as manufactured by 3M or product by one of following meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.
b. Or approved equal.

F. Aluminum Sheet and Plate: ASTM B 209, alloy and temper indicated.

1. Provide alloy 5005-h32 for anodized finishes and alloy 3003-h14, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

G. Aluminum Extrusions: ASTM B 221, alloy and temper indicated.

1. Provide alloy 6063 T-6 for anodized finishes and alloy 6061 T-6, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
3. Anodizing and Plating: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Danco.
b. LNL Anodizing.
c. Highland Plating.

H. Clear Coat Finish:

1. Basis of Design: Subject to compliance with requirements, provide following products comprising complete non-yellowing, U.V. stable, clear coat finish system as manufactured by Matthews Paint Co. or product by manufacturer specified as acceptable manufacturer meeting or exceeding performance requirements of Basis of Design product:

a. Pretreatment: Tarnish retarding pretreatment #74-737 Braco Pretreatment.
b. Adhesive: Clear, colorless adhesive #74-793 Spray Bond.
c. Finish: Final clear coat finish equal to #282-260 Braco Clear.

1) Catalyst #283-800.
2) Reducer #285-100 Exempt Reducer.

2. Acceptable Manufacturers:

a. AKZO Nobel.
b. PPG.
c. Or approved equal.

I. High Performance Graphic Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal and Scotchlite Film/Sheeting as manufactured by 3M or product by one of following meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.

2. General: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back or face, as required for first or second surface installations; die cut to form characters or images as indicated and suitable for exterior applications.

J. High performance adhesive vinyl sheet:

1. Basis of Design Product: Subject to compliance with requirements, provide by one of following manufactures or equal product meeting or exceeding performance requirements of a named manufacturer:

a. 3M

K. Screen Printing Ink: Subject to compliance with requirements, provide product by one of following manufacturers or equal product meeting or exceeding performance requirements of a named manufacturer:

1. Warnow; Decal Du_Well Enamel.
2. Nazdar Inks.
3. Or approved equal.

4. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

L. Very High Bond Foam and Transfer Tape:

1. Basis of Design Product: Subject to compliance with requirements, provide VHB Acrylic Foam Tape, and VHB Isotac Tape as manufactured by 3M.

2.6 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with following:

1. Use concealed fasteners and anchors unless indicated on accepted Shop Drawings to be exposed.
2. Furnish stainless steel devices unless otherwise indicated.
3. Furnish stainless steel masonry inserts for embedment in concrete or masonry work.
4. Furnish stainless steel j-bolts for embedment in concrete or masonry work.
5. Furnish stainless steel All Thread to be secured with epoxy adhesive into concrete or masonry work.

B. Silicone Adhesive:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Dow.
b. General Electric.
c. C.R. Lawrence.
d. or approved equal

C. Structural Adhesive:

1. Basis of Design Product: Provide Versilok two-component epoxy-modified acrylic adhesive, with beads, as manufactured by Lord Corporation recommended by adhesive manufacturer for each application or, subject to compliance with requirements, comparable product by one of following, or equal:

a. Akzo Nobel; Liquid Nails Construction Adhesive.
b. Henkel Loctite Corporation; Locktite Construction Adhesive.
c. Or approved equal.

2.7 FABRICATION

A. General: Manufacturer shall provide labor, materials, tools, fixtures, jigs, equipment, and facilities necessary for production of Work required by Contract Documents.

1. Preassemble signs in shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
4. Conceal fasteners and anchors unless indicated to be exposed; locate exposed fasteners where they will be inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Form panels to required size and shape as indicated on Drawings. Comply with requirements for design, dimensions, finish, color, and details of construction.
7. Obtain identification labels which shall conform to Underwriters Laboratories requirements.
8. Locate markings, labels, and manufacturer names and other identifications so as to be concealed from public view and as acceptable to Owner's Representative.
9. Provide wet stamped engineering calculations.
10. On new sign products of duplicate design and fabrication, vendor shall assume interchangeability of components, regardless of manufacturing origins.
11. For sign cabinets mounted to walls and other vertical surfaces, or to roofs and other horizontal surfaces and to concrete footings, use stainless steel anchoring hardware.
12. Provide stainless steel aircraft cable and zinc plated mounting hardware and fittings for hanging or suspending signage or graphics components.

B. Aluminum Cabinets:

1. Provide cabinets of seamless welded aluminum construction with brake formed returns where applicable and joints welded, ground and finished smooth.

    a. Provide internal structural framing of welded aluminum construction.
    b. Use sourced and approved aluminum extrusions for cabinet bodies, retainers, posts, and frames, where applicable.
    c. For internally illuminated sign cabinets, paint interior surfaces white to optimize reflection.
    d. Flat or Formed Acrylic or Polycarbonate Sheet Surfaces: Allow for expansion and contraction to prevent blowout.
    e. Except as otherwise indicated, fasteners shall be stainless steel and concealed; when exposed, fasteners shall be countersunk and finished to match adjacent surface.
    f. Electrolysis: Prevent corrosive action due to electrolysis by separating ferrous and non-ferrous metals with neoprene or vinyl spacers, or by using stainless steel fasteners.

C. Very High Bond Tape (VHB):

1. Provide type of VHB recommended in writing by tape manufacturer for each tape application.
2. Apply tape in accordance with tape manufacturer's written instructions for each tape application.

    a. Pre-treat surfaces prior to application of tape, removing oil and foreign matter and lightly sand bonding surfaces prior to tape application.
    b. Prior to removal of carrier tape, burnish tape to first applied surface to activate adhesive properties.
    c. Re-burnish bond areas and clamp elements together for time specified by tape manufacturer.

D. Acrylic Panels: Finish exposed edges of panels smooth with polished or painted finish as noted on Drawings. All edges to be eased and exposed lamination seams shall not be permitted.

E. Formed clear acrylic or polycarbonate sheet:

1. Sheet to have formed 90 degree returns at sides and be without crazing or cracking on corners or surface; edges to be smooth finished.

F. ADA/ADAAG /SAD Code Compliant Signs:

1. Sign face shall have an applied sheet of surface painted raised copy and Grade 2 translation Braille.
2. Edges shall be flush, eased and finished.
3. Spray paint panel face background and edges.
4. Sign face shall have applied laser cut surface painted raised copy and transparent Grade 2 translation bead Braille bonded into holes engraved into sign face after painting.

G. California Title 24 Compliant Restroom Signs:

1. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male symbol for attachment to Men's Restroom door.
2. Provide painted acrylic circular disk panel with eased edges and direct digital print female symbol for attachment to Women's Restroom door.
3. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male and female symbols bonded over painted acrylic circular disk panel with eased edges for attachment to Unisex Restroom door.
4. Production Option for Symbols on Signage: Screen printing.

H. Regulatory Signs:

1. Provide acrylic panel with eased edges and radiused corners, and with direct digital print copy and or symbol.
2. Production Option for Copy and Symbols on Signage: Screen printing.

2.8 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Appearance of Finished Work / "Fabrication": Noticeable variations within same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

C. Appearance of Finished Work / "Paint": Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

2.9 PAINT FINISH

A. Performance Requirements: Acceptable performance is defined as follows:

1. Will not crack, check, or peel (lose adhesion) except when cracking or crazing is a result of metal fracture.
2. Will not chalk in excess when measured in accordance with the standard procedures as defined by the "Standard Methods of Evaluating Degree of Chalking of Exterior Paints", ASTM D4214-89.
3. Will not fade or change in color when exposed painted surfaces, which have been cleaned of external deposits and chalk, are measured by a spectro-photometer or color meter. It is understood that fading or color change may not be uniform if the surfaces are not equally exposed to the sun and elements.

    a. Process requirements - All surfaces shall be degreased, cleaned, and rinsed well. Drying the substrate may be necessary to prevent white rust. Remove mill scale by sandblasting if necessary.
    b. Scuff metal surfaces and make ready for self-etching primer. Apply wash / filler primer in multiple passes, yielding a minimum of .5 mil dry film thickness.
    c. Apply finish paint, following manufacturer's recommendations for mixing and application.
    d. Apply sprayed on, Low VOC protective clear coat /anti-graffiti finish, following manufacturer's recommendations for mixing and application. Final applied clear coat finish shall be Satin Clear.

B. Perform crosshatch adhesion test on painted parts as prescribed by ASTM D3359-93 "Standard Test Methods for Measuring Adhesion by Tape Test".

2.10 BRUSHED AND POLISHED FINISH

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean. Provide following finish where indicated.

    a. Directional Satin Finish: No. 4 with grain in horizontal direction, unless otherwise indicated.

C. Provide pretreatment and protective clear coat finish to all areas of polished or brushed metal surfaces including brass, bronze, and stainless steel.

D. Clear Coat Finish: Comply with clear coat finish manufacturer's written instructions for mixing and applying onto specific metal substrates.

2.11 COPY AND GRAPHICS APPLICATION

A. General Requirements: Provide Adobe Type I Postscript Font available from Adobe Systems for copy applications except as otherwise noted on Drawings. Typestyle indicated on Drawings is for information only. For production, provide software able to reproduce project graphics exactly.

1. Ensure that size and placement of copy comply with dimensions for letter height, line spacing, and placement as either noted on Drawings, in digital files, or final approved lettering patterns.
2. Ensure that baselines of copy are straight and parallel with top or bottom of sign structure unless otherwise noted.
3. Ensure that edges of letter forms and numerals are true and smooth with straight and curved sections representing specified Project typestyle exactly.
4. Letterforms, numerals and graphics shall be free of imperfections and distortions of straight lines or curves. Rounded letter forms shall extend slightly below normal baseline per respective typestyle characteristics.

B. Screen Printed Copy: Provide photo-mechanically produced screens for copy and characters from computer generated files. Print copy using fine mesh screens and screening inks.

1. Pre-treat surfaces by applying one protective coat of clear acrylic polyurethane.
2. Ensure that surface of letters are uniform in color, finish, and free of pinholes and imperfections.
3. Match sign message and background colors to approved color samples in every respect for consistency in chroma, value, and coverage.
4. Provide sign colors that maintain proper opacity or translucency and are free of blistering, bleeding, or fading. Color registration shall be crisp, sharp, and free of imperfection.
5. Ink colors to match colors as specified on drawings.

C. High Performance Graphics Film Applications: Provide machine cut film copy and characters from computer-generated files.

1. Pre-treat surfaces for High Performance graphic film application in accordance with manufacturer’s specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Spacing of copy shall be done according to approved samples utilizing pre-spacing application tapes.
4. Provide film type and color to match type and color specified on Drawings.

D. Masked and Painted Copy and Graphics Applications: Provide machine cut copy and character painting masks from computer-generated files.

1. Pre-treat surfaces for painting in accordance with paint manufacturer’s specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter.
3. Paint types for application conditions to be in accordance with paint manufacturer’s specification and recommendations. Paint colors to match colors specified on Drawings.

E. Direct Digital Print Copy and Graphics Applications: Provide direct digital printing on specified substrate from computer generated files using flat bed four color ink jet printer.

1. Prepare surface for printing in accordance with printer manufacturer’s specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Ink types for application conditions to be in accordance with printer manufacturer’s specifications and recommendations. Ink colors to match colors specified on Drawings.

F. Direct Digital Printing:

1. Material Substrates, including but not limited to:

   a. Aluminum sheet.
   b. Adhesive backed vinyl film.
   c. Painted acrylic sheet.
   d. Unpainted acrylic sheet.
   e. Polycarbonate.

2. Protective Finish Coatings:

   a. Applied clear vinyl film.
   b. Sprayed on protective finish.
   c. Rolled on protective finish.

3. Surfaces shall be smooth and free of dust, grease, wax or other foreign matter prior to application.
4. Production Process: Provide digitally printed control samples of project color palette for fabricators to match with samples from their digital printing output, fabricator sample subject to approval.

G. Anti-Graffiti Coating applied to Finished Signs:

1. Apply anti-graffiti aerosol spray coating in accordance with coating manufacturer's written recommendations for each application.
2. Apply anti-graffiti protective film in accordance with film manufacturer's written recommendations for each application.

H. Anti-graffiti Coatings for Sign Faces: Apply 3M Scotchcal Matte Overlaminate 3642 GPS anti-graffiti film to sign faces. Apply after copy has been applied per manufacturer's instructions.

I. Frisket Masked and Painted:

1. Mask and paint process onto material substrates, including by not limited to:

   a. Painted aluminum.
   b. Painted acrylic or polycarbonate.
   c. Facility concrete wall or surfaces, or CMU walls.

2. Preparation: Comply with paint manufacturer's written recommendation for each substrate to be painted.
3. Protective Finish Coating:

   a. Sprayed on clear coat; Select one of following Low VOC finish sheens as determined by Project Design Team on Project to Project basis:

      1) Matte.
      2) Satin.
      3) Gloss.

2.12 QUALITY CONTROL

A. Provide work-in-progress sign elements for review. Scheduled viewings at Shop or Factory may be initiated as deemed necessary to ensure continued quality control during fabrication.

1. Correct unsatisfactory items as directed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs.

C. Verify that concrete sign footings are sacked, finished and chamfered, and without cracks or broken edges.

D. Verify that pre-installed anchors, if any, are correctly sized and located to accommodate signs.

E. Verify that dedicated electrical circuit is located to accommodate illuminated signs.

F. Locate pre-installed external sign lighting, if applicable, and verify clearance for sign installation.

G. Review documents and confirm conditions and dimensions indicated and identify number of units and locations of Project signage.

1. Sign locations indicated on Drawings are for reference only. Exact locations shall be field verified with Owner’s Representative prior to installation.
2. Identify sign locations on site by numbered stake that includes sign type item number.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install exterior signage using installation methods indicated and in accordance with manufacturer’s written instructions.

1. Signs shall be produced by authorized manufacturers and installed by Union sign companies where required. For State of California, work shall be completed by C-45 licensed installers.
2. Signs shall be installed only after securing proper permits and complying with local ordinances. Should a variance be required, installation shall be placed on hold until such time as proper authorization is granted.
3. Installation work shall be performed in accordance with OSHA standards (Occupational Safety and Health Administration). Equipment shall be operated in a safe manner, with safe clearances between work area and any nearby utility lines.
4. Coordinate underground excavation with local utility board prior to commencing earth removal.

5. Disposal of material shall be performed in accordance with prevailing environmental laws and governmental agencies.
6. Open excavations shall not be abandoned for any reason. If overnight completion is required, excavation shall be surrounded with reflective barricades clearly indicating construction zone.
7. Installation contractor shall not erect damaged signs or components. Shipping damage shall be reported to manufacturer and repair or replacement made prior to installation.
8. Installation work shall be performed in accordance with OSHPD standards, and certain facilities may require coordination and approval of OSHPD inspection.
9. Install signage level and plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
10. Install signs so they do not protrude or obstruct, in accordance with applicable accessibility standards.
11. Prior to installation, verify that sign components are clean and free of materials or debris that could impair installation.
12. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with heavy coat of bituminous paint.
13. Connect electrical signs to stubbed power source. Test lighting components after dark to ensure functionality.
14. Remove temporary protective coverings and strippable films as signs are installed.
15. Restore adjacent building surfaces damaged during exterior signage installation to original condition.

    a. Preserve sod and topsoil and replace after backfilling is completed

        1) Replace damaged sod with sod of quality equal to that removed.

    b. Where surface is disturbed in newly seeded area, restore surface to be reseeded with same quantity and formula seed as that used in original seeding.

3.3 ADJUSTING AND CLEANING

A. Adjust hardware and electrical equipment for proper operation.

B. Clean glass, frames, and other exterior signage surfaces in accordance with manufacturer’s written instructions.

C. Remove damaged or deformed exterior signage and signage that does not comply with specified requirements. Replace with exterior signage complying with requirements.

D. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

E. Maintain exterior signage in clean condition during remainder of construction and protect from damage until acceptance by Owner.

F. Remove packing materials, cartons, and any trash from the Site at the end of each days work.

    1. To maximum extent possible, recycle materials in accordance with requirements of USGBC and requirements and initiatives of agencies having jurisdiction.

3.4 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12-months' full maintenance by skilled employees of signage Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, and adjusting as required for proper signage operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.
2. Perform emergency callback service during normal working hours with response time of two hours or less.
3. “Acts of God”, “Acts of nature”, or similar term shall be applicable to wind related effects only when recorded wind speeds at nearest official weather recording station exceed Basic Wind Speed for that location as defined by prevailing building code.

3.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Project Design Team's List of Incomplete Items (Punch List): Prepare and submit list of items requiring completion or correction, indicating value of each item on list and reasons for Work being incomplete.

3.6 EXTERIOR SIGNAGE SCHEDULE

A. Graphics Schedule document is to be used in conjunction with other components of Contract Documents, consisting of Sign Location Plans and Design Drawings.

END OF SECTION 101402

SECTION 10 14 04

INTERIOR SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Provide Project interior signage including:

1. Sign Type 26: Unused
2. Sign Type 30: Area Identification Dimensional Copy.
3. Sign Type 31: Department/Suite Identification Plaque.
4. Sign Type 33 : Area Identification Super Graphic.
5. Sign Type 40: Room Identification Tactile & Braille Plaque.
6. Sign Type 41: Room Identification W/Changeable Insert Tactile & Braille Plaque.
7. Sign Type 42: Room Identification W/In-Use Window Tactile & Braille Plaque.
8. Sign Type 43A: Vertical Stack Identification – Adult.
9. Sign Type 43B: Vertical Stack Identification – Teen.
10. Sign Type 43C: Vertical Stack Identification – Child.
11. Sign Type 45: Restroom Identification – ADA.
12. Sign Type 46: Restroom Identification – Title 24.
13. Sign Type 47: Area Identification – Flag.
14. Sign Type 50: Egress Directional – Small ADA Code Plaque.
15. Sign Type 53: Equipment Identification Flag.
16. Sign Type 70: Information/Regulatory Small – Plaque
17. Sign Type 72: Information – Frame Clear Acrylic.

B. Related Requirements:

1. Section 101402 “Exterior Signage”.

1.3 REFERENCES

A. ADA/ADAAG/SAD – Standards for Accessible Design.

B. American Society for Testing and Materials (ASTM):

1. ASTM A 500/A 500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. American Welding Society (AWS):

1. AWS D1.1: Structural Welding Code - Steel.
2. AWS D1.2: Structural Welding Code – Aluminum.

D. California Public Safety Codes -Title 19.

E. California Title 24.

F. Green Seal Standard GS 11 “Paints and Coatings”.

G. International Building Code (IBC 2012), unless instructed to use or reference an earlier IBC dated code by the Project Architect.

H. California Building Code (CBC 2013)

I. National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual”.

J. National Electric Code (NEC).

K. California Electric Code (CEC)

L. National Fire Protection Association (NFPA).

M. Office of Statewide Health Planning and Development (OSHPD) –Seismic and Life Safety Standards specific to California.

N. South Coast Air Quality Management District (SCAQMD):

1. Rule #1168 “Adhesive and Sealant Applications”.

O. Underwriters Laboratories (UL):

1. UL Standards 48 - Signs.
2. UL Standard 1570 - Fixtures.

P. U.S. Green Building Council (USGBC) Leadership in Energy & Environmental Design (LEED).

1.4 COORDINATION

A. Furnish templates made from rigid material and provide tolerance information for placement of sign-anchorage devices to be embedded in permanent construction by other installers.

1. Clearly mark each template with a “Side A / Side B” reference, and include a directional marking to denote “North.”

B. Furnish templates for placement of electrical service to be embedded in permanent construction by other installers. Include Data cable/s and any shielding or conduit locations as required for the installation of digital displays/monitors.

1.5 ACTION SUBMITTALS

A. General: Except as otherwise indicated, comply with requirements of Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.

1. Include fabrication details, material descriptions, dimensions overall and dimensions of individual components.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. Include data for paint, coatings, and other finish materials as required to show compliance with specified requirements.

C. Material Data:

1. Submit material cost data for materials required to construct Work in place. Material cost shall reflect actual cost of material without added Contractor mark-up.
2. Provide manufacturer's information/data sheet or letter from manufacturer indicating location of manufacture, amount of recycled content (post consumer and industrial percentage in product), and location of raw material harvest if within 500 miles of Project site.
3. If requested by Owner, submit manufacturer's Material Safety Data Sheet (MSDS) directly to Owner.

D. Shop Drawings: Provide one set of reproducible Shop Drawings in electronic Acrobat PDF format and as a paper print set, drawn to scale, detailing sign fabrication and installation. Provide DVD with electronic copy of Shop Drawings.

1. Include fabrication and installation details relating to attachments to other work.
2. Show sign mounting in plan and elevation; show supplementary supports and all accessories to be provided by others, clearly identified on the shop drawings.
3. Provide printed-paper copy layout of each sign type, not less than 1/2 size.
4. Show locations of electrical service connections.
5. Include schematic diagrams of electrical circuitry and components.
6. Schedule and describe sign anchorage assemblies and their related components.
7. Show location of inserts for anchors and supports, which are to be attached to structure or built into concrete or masonry, if any.
8. Support and Backing in Walls (new construction): Sign Contractor with the assistance of the General Contractor shall provide engineered sign supports anchored to the building's structure where required and to meet applicable sign code requirements. Installations requiring support or backing within the building wall construction shall be immediately relayed to the Architect of Record and Construction Manager's Representative for field coordination. Location plans and the dimensions on the design drawings to be utilized for placement of each sign type. Should any obstructions prohibit installing the signage in any given location, the General Contractor (GC) shall be notified immediately and the GC and Architect shall provide alternate locations as required.
9. Support and Backing in Walls (existing construction): Sign Contractor with the assistance of the General Contractor shall provide engineered sign supports anchored to the building's existing structure or framing (i.e. metal or wood studs) as required, to meet applicable sign code requirements. For conditions where metal stud framing exists, install finished signage using sheet metal fasteners / screws set directly into studs. However, for existing field conditions where wood or metal wall studs are inaccessible, but where the finished walls consist of gyp board anchored to internal framing, the finished signage shall be installed using Easy Anchor drywall anchors (or equal), with sheet metal screws,

set into the gyp board over framed walls. Installations requiring additional support or backing within the building wall construction shall be immediately relayed to the Architect of Record and Construction Manager's Representative for field coordination. Location plans and the dimensions on the design drawings to be utilized for placement of each sign type. Should any obstructions prohibit installing the signage in any given location, the General Contractor (GC) shall be notified immediately and the GC and Architect shall provide alternate locations as required.

10. Shop Drawings shall be new drawings prepared specifically for the Project.

    a. Re-submittal of issued Drawings with title block modifications is not acceptable.

11. Shop drawings may be submitted electronically, saved as a PDF file, for review and comment by the design team.

E. Engineering Drawings and Analysis: Sealed and signed by Professional Structural Engineer, responsible for preparation of engineering analysis who thereby certifies preparing or supervising preparation of data to comply with specified requirements and recognized engineering principles and practices. Engineering Drawings include, but are not limited to:

1. Plans, elevations, sections, and details for fabrication and installation of sign structures indicating sizes, dimensions profiles and arrangement and provisions for jointing, supporting, anchoring, and fastening.
2. Include details showing relationship with, attachment to, and reception of related Work (i.e. "Retrofit to Existing Structure").

    a. Indicate details of adjoining Work, even though not included in Work of this Section, to ensure coordination of Work and Work of other Sections.
    b. Reference Architect detail numbers where applicable.

F. Samples:

1. Paints and Coatings:

    a. Color Samples: Submit 2 samples of each color, sheen, and texture of paint finish on minimum 4 by 6 inch aluminum sheet to simulate the actual finish. Resubmit each sample as requested until required color, sheen, and texture are achieved.
    b. Technical Specifications: Submit 2 copies of technical specifications of paint, coatings, and other finish materials.

2. Lettering Patterns: Submit 2 full-size lettering patterns of sign messages, symbols, or other graphic elements related to sign fabrication.
3. High Performance Graphic Film Copy: Submit 2 mounted, one-line samples of each size, color, typestyle, and font on pre-spaced tapes.
4. Screen Processed Copy: Submit 2 prints of film positives.
5. Hardware Samples: Submit 2 samples each of hardware such as hinges, locks, and fasteners that will be exposed to view.

G. Sign Prototype: Submit prototype to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

H. Prototypes:

1. Submit 1 prototype of each of the following:

   a. Sign Type 26, 31, 47: One complete sign including copy application.
   b. Sign Type 30: One finished letter.
   c. Sign Type 43: Sign in progress at shop.

2. Subsequent fabrication shall conform to accepted prototypes.
3. Approval of prototypes does not constitute approval of deviations from Contract Documents unless the Architect / Designer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved prototypes may become part of completed Work if undisturbed at time of Substantial Completion.

I. Graphics Schedule: For interior signage, reference the same sign item numbers as indicated on Drawings.

J. Delegated-Design Submittal: For Interior signage indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional structural engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Manufacturer.

B. Welding Certificates.

C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: To include in emergency, operations, and maintenance manuals.

B. Record Submittals (As-Builts): Prepare and submit final record drawings, specifications, and current status documents, saved in digital/PDF format for signs provided as Work of this Section.

1. Comply with requirements of Section 01 77 00, except as otherwise indicated.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed, and that are packaged with protective covering for storage, and identified with labels describing contents.

1. Provide extra stock of following:
   a. Furnish 1 gallon of each finish paint color for touch-up purposes. Include information on each paint manufacturer and order code numbers.

1.9 QUALITY ASSURANCE

A. Sign Contractor Qualifications: Company regularly engaged in the manufacture of Interior signage similar to product specified for this Project.

1. Contractor shall develop a fabrication and installation project schedule, and demonstrate the capability for creating a project database with customer / client accessibility, based upon receipt of Notice to Proceed, and outlining the durations for submittals, submittal reviews, fabrication, installation and Project completion.
2. Professional Engineer Qualifications: A professional structural engineer who is legally qualified to practice in jurisdiction where Project is located and who is capable in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with Sign Contractor’s ordering instructions and lead-time requirements to avoid construction delays.

B. Submit detailed description of crating method and materials used for shipment of large scale, fabricated signs or letters to Project team for review and approval prior to actual crating and shipping. Secure finished signage components within crate and protect from shipping or weather-related damage.

C. Deliver to jobsite in Sign Contractor’s original unopened and undamaged packaging with identification labels intact.

D. Store in lockable, clean, dry area protected from weather, temperature, and other harmful conditions in accordance with Sign Contractor’s written instructions.

E. Handle products in accordance with Sign Contractor’s written instructions.

1.11 FIELD CONDITIONS

A. Field Measurements:

1. Inspect existing conditions and verify dimensions related to fabrication and installation of Interior signage prior to production.
2. Verify locations of any anchorage devices and /or electrical service provisions specific to the signage installation, and any embedments made within permanent construction and executed by others. Recheck site /in-field conditions prior to the final graphics installations.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in function, materials or workmanship within specified warranty period.

1. Failures include, but are not limited to following, as applicable to each sign type:

a. Deterioration of finishes beyond normal wear.
b. Deterioration of embedded graphic image.
c. Separation or de-lamination of sheet materials and components.
d. Mounting failure.
e. Electrical failure.
f. Structural failure.

2. Warranty Period: One (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturer's offering products that may be incorporated into Work include, but are not limited to:

1. 3M.
2. AKZO Nobel.
3. APCO Graphics, Inc.
4. Arlon Graphics, LLC.
5. ASI Sign Systems, Inc.
6. Matthews Paint Co.
7. PPG.
8. Sign Comp.
9. Sign Systems.

2.2 FABRICATORS

A. Fabricators: Subject to compliance with requirements, available fabricators approved for fabricating signage components and assemblies specified in this Section include, but are not limited to:

1. AD/S Design & Signs.
2. CNP / California Neon Products.
3. Encore Image.
4. Karman.
5. National Sign and Marketing Corporation.
6. Neiman & Company.
7. Sign Designers.
8. Sign Industries.
9. T Graphics.

2.3 SYSTEM DESCRIPTION

A. Frame and Enclosure:

1. Design, fabricate and install structural and non-structural support framing in accordance with requirements of authorities having jurisdiction.
2. Design system to accommodate construction tolerances, deflection of structural members, and clearances of intended openings of associated structures.

3. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with requirements of authorities having jurisdiction for seismic zone # 4.

2.4 PERFORMANCE REQUIREMENTS

A. Design Rights: Sign Contractor is hereby granted limited right to designs as indicated on Design Drawings and specified in this Section for sole purpose of completing contractual obligations to fabricate and install Project signage. Sign Contractor may not manufacture, reproduce, or exhibit designs or modify designs for any other purpose without prior written consent.

B. Substitutions: No substitutions to fabrication process or material selections allowed unless approved by Architect / Designer in writing prior to fabrication.

C. Sign Contractor's Responsibilities:

1. Provide labor, materials, and products required to fabricate and install Interior signage and graphic items detailed, noted, or specified in Contract Documents.
2. Identify Signage permit costs, obtain the required permit/s, and cover all costs associated to said permits, including plan checks submittals, processing fees and all applicable taxes.
3. Provide engineering design as required for approvals and permits.
4. Provide typographic copy layouts, and other finished artwork, unless otherwise specified.
5. Provide for Union Labor (where required) for installation of finished signage.
6. Provide sufficient support and coordination throughout the following phases:

    a. Submittal of shop drawings.
    b. On-site field surveys.
    c. Sign prototypes.
    d. Sign fabrication.
    e. In-shop design milestone reviews.
    f. RFI process.
    g. Coordination of shipping/delivery of finished signage to job site.
    h. Final installation.
    i. Participation in final punch-list walk.
    j. Correction of any identified deficiencies noted by project Design team and/or Client.

D. Delegated Design:

1. Engage a qualified professional structural engineer as defined in this Section to design sign structure and anchorage.

    a. Provide complete engineering drawings and calculations sealed and signed by responsible engineer.
    b. Provide engineering design as required for approvals and permits.

E. Accessibility Standard: Comply with applicable provisions in U.S. Architectural & Transportation Barriers Compliance Board's ADA/ADAAG Accessibility Guidelines for Buildings and Facilities, SAD (Standards for Accessible Design), and ICC A117.1 for signs.

F. Electrical Components: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.

2.5 MATERIALS

A. Acrylic Polyurethane Paint:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

   a. AKZO Nobel.
   b. Matthews Paint Co.
   c. PPG.

2. General: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
3. Paint systems / products must be either Ultra Low VOC or Low VOC compliant.

B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

   a. Evonite Cyro, LLC: Acrylite.
   b. Rohm and Haas: Plexiglas.

C. Adhesives:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

   a. Dow Corning.
   b. General Electric.
   c. Lord Adhesive.

D. Anti-Graffiti Aerosol Spray Coating:

1. Basis of Design Product: Subject to compliance with requirements, provide one of the following finishes: Low VOC Satin Clear, Low VOC Gloss Clear, Low VOC Braco Clear (for decorative metals), or Low VOC Super Satin Clear/anti graffiti as manufactured by Matthews Paint Co. or approved equal meeting or exceeding performance requirements of Basis of Design product:

   a. Spraylat.

E. Anti-Graffiti Protective Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal Matte Overlaminate 3642 GPS as manufactured by 3M or product by the following, meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.

F. Aluminum Sheet and Plate: ASTM B 209, alloy and temper indicated.

1. Provide alloy 5052-h32 for anodized finishes and alloy 3003-h14, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

G. Aluminum Extrusions: ASTM B 221, alloy and temper indicated.

1. Provide alloy 6063 T-6 for anodized finishes and alloy 6061 T-6, mill finish, for painted finishes.
2. Where alloy and temper are not indicated, provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
3. Anodizing and Plating: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work to include, but are not limited to:

a. Danco.
b. LNL Anodizing.
c. Highland Plating.

H. High Performance Graphic Film:

1. Basis of Design Product: Subject to compliance with requirements, provide Scotchcal and Scotchlite Film/Sheeting as manufactured by 3M or product by the following, meeting or exceeding performance requirements of Basis of Design product:

a. Arlon Graphics, LLC.

2. General: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back or face, as required for first or second surface installations; machine / computer cut to form characters or images as indicated and suitable for Interior applications.

I. Interior Digital Color Prints:

1. Manufacturers: Subject to compliance with requirements (Piezo ink jet printed and / or a Mimaki UV Digital Printer, with an acceptable overlaminate or applied second surface, and a Design life of 3-5 years), manufacturer's offering products that may be incorporated in the Work include, but are not limited to:

a. Color Edge.
b. Lithographix.
c. Rembrandt.
d. Supercolor Digital.

J. Screen Printing Ink: Subject to compliance with requirements, provide product by one of following manufacturers or equal product, meeting or exceeding performance requirements of a named manufacturer:

1. Warnow; Decal Du-Well Enamel.
2. Nazdar Inks.

K. Stainless Steel Sheet and Plate: ASTM A 240/A240M or ASTM A 666, Type 304 shall be the default material specification, however, the following material types shall be specified when additional corrosion resistance is required, 304L, and shall conform to the stretcher-leveled standard of flatness.

L. Very High Bond Foam and Transfer Tape:

1. Basis of Design Product: Subject to compliance with requirements, provide VHB Acrylic Foam Tape, and VHB Isotac Tape as manufactured by 3M.

2.6 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, non-corrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated on accepted Shop Drawings for fasteners/anchors to be exposed.
2. Furnish stainless steel devices unless otherwise indicated.
3. Furnish stainless steel masonry inserts embedment into concrete or masonry work.
4. Furnish stainless steel j-bolts for embedment in concrete or masonry work / footings.
5. Furnish stainless steel All Thread to be secured with epoxy adhesive into concrete or masonry work / footings.

B. Silicone Adhesive:

1. Manufacturers: Subject to compliance with requirements, manufacturer's offering products that may be incorporated in the Work to include, but are not limited to:

a. Dow.
b. General Electric.
c. C.R. Lawrence.

C. Structural Adhesive:

1. Basis of Design Product: Provide Versilok two-component epoxy-modified acrylic adhesive, with beads, as manufactured by Lord Corporation recommended by adhesive manufacturer for each application or, subject to compliance with requirements, comparable product by one of following:

a. Akzo Nobel; Liquid Nails Construction Adhesive.
b. Henkel Loctite Corporation; Locktite Construction Adhesive.

2.7 FABRICATION

A. General: Manufacturer shall provide labor, materials, tools, fixtures, jigs, equipment and facilities necessary for production of Work required by Contract Documents.

1. Preassemble signs in shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
2. Mill joints to tight, hairline fit.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
4. Conceal fasteners and anchors unless indicated as exposed; locate exposed fasteners where they will be inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Form panels to required size and shape as indicated on Drawings. Comply with requirements for design, dimensions, finish, color, and details of construction.
7. Obtain identification labels, which shall conform to Underwriters Laboratories requirements.
8. Locate markings, labels, and manufacturer names and other identifications so as to be concealed from public view and as acceptable to Owner's Representative.
9. Provide wet stamped engineering calculations.
10. On new sign products of duplicate design and fabrication, vendor shall assume interchangeability of components, regardless of manufacturing origins.
11. For sign cabinets mounted to walls and other vertical surfaces, or to other horizontal surfaces, use zinc or steel anchoring hardware.
12. Provide stainless steel aircraft cable and zinc plated mounting hardware and fittings for hanging or suspending signage or graphics components.

B. Aluminum Cabinets:

1. Provide cabinets of seamless welded aluminum construction with brake formed returns where applicable and joints welded, ground and finished smooth.

    a. Provide internal structural framing of welded aluminum construction.
    b. Use sourced and approved aluminum extrusions for cabinet bodies, retainers, posts and frames where applicable.
    c. For internally illuminated sign cabinets, paint interior surfaces white to optimize reflection.
    d. Flat or Formed acrylic or Polycarbonate Sheet Surfaces: Allow for expansion and contraction.
    e. Except as otherwise indicated, fasteners shall be stainless steel and concealed; when exposed, fasteners shall be countersunk and finished to match adjacent surface.
    f. Electrolysis: Prevent corrosive action due to electrolysis by separating ferrous and non-ferrous metals with neoprene or nylon spacers, or by using stainless steel fasteners.

C. Very High Bond Tape (VHB):

1. Provide type of VHB recommended in writing by tape manufacturer for each tape application.
2. Apply tape in accordance with tape manufacturer's written instructions for each tape application.

    a. Pretreat surfaces prior to application of tape, removing oil and foreign matter and lightly sand bonding surfaces prior to tape application.
    b. Prior to removal of carrier tape, burnish tape to first applied surface to activate adhesive properties.
    c. Reburnish bond areas and clamp elements together for time specified by tape manufacturer.

D. Acrylic Panels: Finish exposed edges of panels smooth with polished or painted finish as noted on Drawings. All edges to be eased and exposed lamination seams shall not be permitted.

E. ADA / ADAAG / SAD Code Compliant Signs:

1. Option /Tactile Sign: Sign face shall have an applied sheet of surface painted raised copy and Grade 2 translation Braille, and be bonded to the sign substrate. Photopolymer material to be specified as exterior grade product.
2. Option /Tactile Sign: Sign face shall have applied Laser cut surface painted raised copy and transparent Grade 2 translation (Raster bead) Braille, bonded into holes engraved into sign face after painting.
3. Option /Tactile Sign: Sign face shall have Rowmark ADA Alternative appliqué raised copy, matte non-glare finish, 1/32" (.8mm) thickness and transparent Grade 2 translation (Raster bead) Braille, bonded into holes engraved into sign face after painting
4. Edges shall be flush, eased and finished.
5. Spray paint panel face, background and edges.

F. California / Title 24 Compliant Restroom Signs:

1. Provide painted acrylic equilateral triangle panel with eased edges for attachment to Men's Restroom door.
2. Provide painted acrylic circular disk panel with eased edges for attachment to Women's Restroom door.
3. Provide painted acrylic equilateral triangle panel with eased edges and direct digital print male and female symbols bonded over painted acrylic circular disk panel with eased edges for attachment to Unisex Restroom door.

G. Regulatory Signs:

1. Provide acrylic panel with eased edges and 1/8" radiused corners and with direct digital print copy and or symbol.
2. Production Options for Copy and Symbols on Signage: Screen print or Direct Digital print.

2.8 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Appearance of Finished Work / "Fabrication": Noticeable variations within the same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

C. Appearance of Finished Work / "Paint": Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

2.9 PAINT FINISH

A. Performance Requirements: Acceptable performance is defined as follows:

1. Will not crack, check, or peel (lose adhesion) except when cracking or crazing is a result of metal fracture.
2. Will not fade or change in color when exposed painted surfaces (which have been cleaned of external deposits and chalk), are measured by a spectro-photometer or color meter. It is understood that fading or color change may not be uniform if the surfaces are not equally exposed.

    a. Process requirements - All surfaces shall be degreased, cleaned, and rinsed well. Drying the substrate may be necessary to prevent white rust. Remove any mill scale by sandblasting if necessary.
    b. Scuff metal surfaces and make ready for self-etching primer. Apply wash/filled primer, in multiple passes, yielding a minimum of .5 mil dry film thickness.
    c. Apply Low VOC paint finish, following the manufacturer's recommendations for mixing and application.
    d. Follow with a sprayed on, Ultra Low VOC protective clear coat/anti graffiti finish, adhering to the manufacturer's recommendations for mixing and application. Final applied clear coat finish shall be Satin Clear.

B. Perform crosshatch adhesion test on painted parts as prescribed by ASTM D3359-93 "Standard Test Methods for Measuring Adhesion by Tape Test".

2.10 BRUSHED AND POLISHED FINISH

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean. Provide following finish where indicated.

    a. Directional Satin Finish: No. 4 with grain in horizontal direction, unless otherwise indicated.
    b. Radial Grind / Swirl pattern: Contractor to match pattern based upon provided control sample.

C. Provide pretreatment and protective clear coat finish to all areas of polished or brushed metal surfaces including brass, bronze, and stainless steel.

1. Clear Coat finish: Comply with clear coat finish manufacturer's written instructions for mixing and applying onto specific metal substrates.

2.11 PAINT FINISH ON ACRYLIC

A. Provide pre-treatment and finishing process as specified and recommended by the manufacturer. Pre-treatment and finish processing shall include the following:

1. Clean and dry surfaces to be free of foreign matter prior to painting.
2. Apply two coats of primer to all surfaces and edges to promote adhesion of finish paint.
3. Lightly sand primer coats prior to applying finish coat. Remove all scratches and imperfections with 320 grit sandpaper.

4. Cleanse surfaces with rag and aliphatic solvent. Surfaces must be dry, clean and degreased prior to painting.
5. Test all paints for adequate adhesion prior to application. Paints shall be acrylic compatible, Matthews MAP 2 part acrylic polyurethane or approved equal.

2.12 COPY AND GRAPHICS APPLICATION

A. General Requirements: Provide Adobe Type I Postscript Font available from Adobe Systems for copy applications except as otherwise noted on Drawings. Typestyle indicated on Drawings is for information only. For production, provide software able to reproduce project graphics exactly.

1. Ensure that size and placement of copy comply with dimensions for letter height, line spacing, and placement as either noted on Drawings, in digital files, or final approved lettering patterns.
2. Ensure that baselines of copy are straight and parallel with top or bottom of sign structure unless otherwise noted.
3. Ensure that edges of letterforms and numerals are true and smooth with straight and curved sections representing the specified Project typestyle exactly.
4. Letterforms, numerals and graphics shall be free of imperfections and distortions of straight lines or curves. Rounded letter forms shall extend slightly below normal baseline per respective typestyle characteristics.

B. Screen Printed Copy: Provide photo-mechanically produced screens for copy and characters from computer generated files. Print copy using fine mesh screens and screening inks.

1. Pre-treat surfaces by applying one protective coat of clear acrylic polyurethane.
2. Ensure that surface of letters are uniform in color, finish, and free of pinholes and imperfections.
3. Match sign message and background colors to approved color samples in every respect for consistency in chroma, value, and coverage.
4. Provide sign colors that maintain proper opacity or translucency and are free of blistering, bleeding, or fading. Color registration shall be crisp, sharp, and free of imperfection.
5. Ink colors to match colors as specified on drawings.

C. High Performance Graphics Film Applications: Provide machine cut film copy and characters from computer-generated files.

1. Pre-treat surfaces for High Performance graphic film application in accordance with manufacturer’s specifications and recommendations.
2. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
3. Spacing of copy shall be done according to approved samples utilizing pre-spacing application tapes.
4. Provide film type and color to match type and color as specified on Drawings.

D. Masked and Painted Copy and Graphics Applications: Provide machine cut copy and character painting masks from computer-generated files.

1. Pre-treat surfaces for painting in accordance with paint manufacturer’s specifications and recommendations.
2. Surfaces shall be perfectly smooth and free of dust, grease, wax, or other foreign matter.

3. Paint types for application conditions to be in accordance with paint manufacturer's specifications and recommendations. Paint colors to match colors as specified on Drawings.

E. Direct Digital Print Copy and Graphics Applications: Provide direct digital printing onto specified substrate from computer generated files using flat bed four color ink jet printer. Prepare surface for printing in accordance with printer manufacturer's specifications and recommendations.

1. Surfaces shall be smooth and free of dust, grease, wax, or other foreign matter prior to application.
2. Ink types for application conditions to be in accordance with printer manufacturer's specifications and recommendations. Ink colors to match colors specified on Drawings.
3. Minimum DPI / resolution requirements - 600 DPI.

F. Direct Digital Printing:

1. Material Substrate not limited to:

a. Aluminum sheet.
b. Adhesive backed vinyl film.
c. Painted acrylic sheet.
d. Unpainted acrylic sheet.
e. Painted polycarbonate sheet.
f. Unpainted polycarbonate sheet.

2. Protective Finish Coatings not limited to:

a. Applied clear vinyl film.
b. Sprayed on protective finish.
c. Rolled on protective finish.

3. Surfaces shall be smooth and free of dust, grease, wax or other foreign matter prior to application.
4. Production Process: Provide digitally printed control samples of project color palette for fabricators to match with samples from their digital printing output, fabricator sample subject to approval.

G. Anti-Graffiti Coatings for Sign Faces: Apply 3M Scotchcal Matte Overlaminate 3642 GPS anti-graffiti film to all sign faces. Apply after copy has been applied per manufacturer's instructions.

H. Anti-Graffiti Coating applied to Finished Signs:

1. Apply anti-graffiti aerosol spray coating in accordance with coating manufacturer's written recommendations for each application.

I. Frisket Masked and Painted:

1. Mask and paint process onto material substrates, not limited to:

a. Painted aluminum.
b. Painted acrylic or polycarbonate.

c. Onto facility concrete or CMU wall surfaces.

2. Preparation: Comply with paint manufacturer's written recommendation for each substrate to be painted.

3. Protective Finish Coating:

a. Sprayed on clear coat; Select one of the following Low VOC finish sheens as determined by the Project Design Team, and on a per Project basis:

1) Matte.
2) Satin.
3) Gloss.

2.13 QUALITY CONTROL

A. Provide work-in-progress sign elements for review. Scheduled viewings at Shop or Factory may be initiated as deemed necessary to ensure continued quality control during fabrication.

1. Correct unsatisfactory items as directed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs.

C. Verify that pre-installed anchors, if any, are correctly sized and located to accommodate signs.

D. Verify existence of dedicated electrical circuit and location for support of illuminated signs.

E. Locate pre-installed external sign lighting if applicable, and verify clearance for sign installation.

F. Review documents and confirm conditions and dimensions indicated and identify number of units and locations of Project signage.

1. Sign locations indicated on Drawings are for reference only. Exact locations shall be field verified with Owner's Representative prior to installation.
2. Identify sign locations / placement on site using blue 3M painters tape strips applied to the actual signage locations, and which incorporates the sign type item number.

G. Proceed with installation only after any unsatisfactory field conditions have been corrected.

3.2 INSTALLATION

A. General: Install Interior signage using installation methods indicated and in accordance with the manufacturer's written instructions.

1. Signs shall be produced by authorized manufacturers and installed by Union sign companies where required. For the State of California, work shall be completed by C-45 licensed installers.
2. Signs shall be installed only after securing proper permits and complying with local ordinances. Should a variance be required, installation shall be placed on hold until such time as proper authorization is granted.
3. Installation work shall be performed in accordance with OSHA standards (Occupational Safety and Health Administration). Equipment shall be operated in a safe manner, with safe clearances between the work area and any surrounding objects or structures.
4. Disposal of material shall be performed in accordance with prevailing environmental laws and governmental agencies.
5. Installation contractor shall not erect damaged signs or components. Shipping damage shall be reported to manufacturer and repair or replacement made prior to installation.
6. Installation work shall also be performed to be in compliance with OSHPD standards, and certain facilities may require additional coordination and approval, including an OSHPD inspection.
7. Install signage level and plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
8. Install signs so they do not protrude or obstruct, in accordance with applicable accessibility standards.
9. Prior to installation, verify that sign components are clean and free of materials or debris that could impair installation.
10. Connect electrical signs to stubbed power source. Test lighting components after dark to ensure functionality.
11. Remove temporary protective coverings and strippable films as signs are installed.
12. Installers to be knowledgeable regarding current Signage Code Requirements.

3.3 ADJUSTING AND CLEANING

A. Adjust hardware and electrical equipment for proper operation.

B. Clean glass, frames, and other signage surfaces in accordance with manufacturer's written instructions.

C. Remove damaged or deformed signage, or any signage that does not comply with specified requirements. Replace with signage complying with requirements.

D. Replace signs having damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

E. Maintain Interior signage in clean condition during remainder of construction and protect from damage until acceptance by Owner.

F. Remove packing materials, cartons, and any trash from Site at end of each workday.

1. To maximum extent possible, recycle materials in accordance with requirements of USGBC and the requirements and initiatives of agencies having jurisdiction.

3.4 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of signage Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, and adjusting as required for proper signage operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.
2. Perform emergency callback service during normal working hours with response time of two hours or less.

3.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Project Design Team's List of Incomplete Items (Punch List): Prepare and submit a list of items to be completed and corrected, indicating the value of each item on the list and reasons why the Work is incomplete.

3.6 INTERIOR SIGNAGE SCHEDULE

GRAPHICS SCHEDULE DOCUMENT IS TO BE USED IN CONJUNCTION WITH OTHER COMPONENTS OF CONTRACT DOCUMENTS, CONSISTING OF SIGN LOCATION PLANS AND DESIGN DRAWINGS.

END OF SECTION 101404

SECTION 10 21 13.14

STAINLESS-STEEL TOILET PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes stainless-steel toilet compartments configured as toilet enclosures and urinal screens.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For toilet compartments. Include accurately scaled, CAD drawn plans, elevations, sections, details, and attachment details.

C. Samples for each type of toilet compartment material indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 STAINLESS-STEEL TOILET COMPARTMENTS

A. Manufacturers: Provide Stainless Steel Partitions by one of the following manufacturers.
   1. Bradley Corporation
   2. General Partitions
   3. Metpar
   4. Or Approved Equal

B. Toilet-Enclosure Style: Floor and Wall anchored.

C. Urinal-Screen Style: Wall hung, wedge shaped.

D. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand applied downward load on grab bar of at least 250 lbf, when tested according to ASTM F 446, without deformation of panel.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

E. Urinal-Screen Construction:

1. Flat-Panel Urinal Screen: Matching panel construction.
2. Integral-Flange, Wall-Hung Urinal Screen: Similar to panel construction, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches thick.
3. Wedge-Shaped, Wall-Hung Urinal Screen: Similar to panels, V-shaped, fabricated for concealed wall attachment, and maximum 3 inches wide at wall and minimum 1 inch wide at protruding end.

F. Facing Sheets and Closures: Stainless-steel sheet of nominal thicknesses as follows:

1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.038 inch.
2. Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than 0.050 inch.
3. Panels: Manufacturer's standard thickness, but not less than 0.038 inch.
4. Doors: Manufacturer's standard thickness, but not less than 0.031 inch.
5. Flat-Panel Urinal Screens: Thickness matching the panels.
6. Integral-Flange, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.031 inch.
7. Wedge-Shaped, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.038 inch.

G. Pilaster Shoes: Stainless-steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

H. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I. Stainless-Steel Finish:

1. Bradley Corporation 5WL Pattern (or approved equal) on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard stainless-steel operating hardware and accessories.

1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

B. Hardware and Accessories: Manufacturer's heavy-duty stainless-steel operating hardware and accessories.

1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel anchors compatible with related materials.

2.4 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.

B. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard toilet compartments and 36-inch wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments designated as accessible and ambulatory.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 3/8 inch.

b. Panels and Walls: 1/2 inch.

2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13.14

SECTION 10 28 00

TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Air dryers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: provide for all products.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 WASHROOM ACCESSORIES

A. Manufacturers: Basis of Design:

1. Bobrick Washroom Equipment, Inc.

B. Refer to Accessory Schedule on drawings for device and model number.

2.2 AIR DRYERS

A. Manufacturers: Basis of Design:

1. Dyson Airblade Model DB AB14.

2.3 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Install Hand Dryer per Manufacturer’s written instructions. Provide solid blocking for attachments and provide necessary electric infrastructure.

C. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

END OF SECTION 10 28 00

SECTION 10 44 13

FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire protection cabinets for fire extinguishers.

B. Related Sections:

1. Section 10 44 16 “Fire Extinguishers.”

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 REGULATORY REQUIREMENTS

A. Fire extinguisher cabinets must comply with CBC Sections 1117B.6 and 1118B.

1.5 QUALITY ASSURANCE

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths. Provide adequate blocking for attachment.

PART 2 - PRODUCTS

2.1 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:

a. J. L. Industries, Inc.

b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.
d. Or approved equal

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Stainless-steel sheet.

D. Recessed Cabinet: Where indicated, cabinet box recessed in walls of sufficient depth to suit style of trim indicated.

1. Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as plaster stop or drywall bead.

E. Door Material: Cold Rolled Stainless Steel sheet.

F. Door Style: flat, no window.

G. Door Hardware: Manufacturer's standard door-operating hardware utilizing two concealed hinges at top and bottom of door, concealed handle and roller latch.

H. Accessories:

1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door after finishing.
2) Application Process: Pressure-sensitive vinyl letters.
3) Lettering Color: Black.
4) Orientation: Vertical.

I. Finishes:

1. Satin Finish Stainless Steel.

2.2 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed, cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.

B. Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

C. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

D. Identification: Apply vinyl lettering at locations indicated.

E. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

F. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

B. Related Sections:

1. Section 104413 “Fire Extinguisher Cabinets”

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

C. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. J. L. Industries, Inc.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.
d. Or approved equal

2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
3. General: Fire extinguishers shall conform to NFPA 10 and Title 19, CCR. Each extinguisher shall be UL Listed, and bear their label. Each extinguisher shall be provided with a California State Fire Marshal (CSFM) service tag indicating the date installed and identifying the extinguisher as "NEW."

B. Type: Unless otherwise indicated or required, provide the standard fire extinguisher for installation as follows:

1. 10-pound capacity rechargeable multi-purpose dry chemical suitable for use in fighting Class A, B, and C fires.
2. Red enameled-steel, pressurized type equipped with pressure gauge, discharge hose and nozzle, squeeze-grip lever/handle, and all-metal head assembly; with mounting bracket (if not for installation in a cabinet).
3. Minimum rating: 4-A:60-B:C.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers within cabinets per 10 44 13, in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 10 44 16

SECTION 11 51 00

LIBRARY EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Library Equipment

B. Related Sections:
   1. 28 10 00 – Electronic Access Control and Intrusion Detection

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

   1. Specific systems under this specification section include library equipment to be provided and installed in the project.

B. Type of Contract.

   1. Project will be constructed under a Lump Sum, Fixed Fee Price contract.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.4 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.5 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide and install minor accessories, such as connectors, adapters, matching devices and equipment items needed for a complete system, even if not specifically mentioned herein or on the drawings, without claim for additional payment.

B. All products and materials to be handled and shipped in accordance with manufacturer's recommendation.

C. Provide protective covering on equipment and furniture during construction to prevent damaging or entrance of foreign matter.

D. Replace at no expense to Owner, product damaged during delivery, storage, handling or construction.

2.2 SUBSTITUTIONS

A. Material substitutions must be submitted in writing and contain manufacturer specifications. An agent of the OWNER Technology Resources department must give written permission for product substitution.

2.3 EQUIPMENT

A. Book Return System (BRS-1)
   1. Provide a complete system including all accessories and equipment items.
   2. Coordinate with the owner’s IT department for configuration settings and connection to the network.
   3. Verify exact requirements with the owner.
      a. Sort Mate 2000 (or approved equal)
      b. Sort Mate 2000 Module (or approved equal)

B. Self-Check Kiosk (SCO-1)
   1. Provide a complete system including all accessories and equipment items.
   2. Coordinate with the owner’s IT department for configuration settings and connection to the network.
   3. Provide the following quantities and locations:
      a. Children’s Area (Qty: 1)
      b. Service Area (Qty: 2)
   4. Verify exact requirements with the owner.
      a. Bibliotheca SelfCheck 1000 - Full Height Kiosk (or approved equal)

C. RFID Gates (RFI-1)
   1. Provide a complete system including all accessories and equipment items.
   2. Coordinate with the owner’s IT department for configuration settings and connection to the network.

3. Provide the following quantities and locations:
   a. Library Entrance Door 100a and 100b (Qty: 2 sets)
   b. Fiction / Non-Fiction Door 130b and 130c (Qty: 2 sets)
   c. Children's Door 122 (Qty: 1 set)
4. Verify exact requirements with the owner.
   a. RFID Gates–Basis of Design:
      1) Bibliotheca RFID Gate Premium Series
   b.

D. RFID Gate Software

1. Install a licensed version of software on one staff computer workstation at Main Circulation Desk. (Qty: 1)
   a. Basis of Design:
      1) Bibliotheca staffConnect Gate Software

E. RFID Workstation
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Installed at staff computer workstations
4. Connects to local computer via USB
5. Provide the following quantities and locations:
   a. Main Circulation Desk (Qty: 2)
   b. Workroom (Qty: 3)
6. Verify exact requirements with the owner.
   a. RFID Workstation–Basis of Design:
      1) Bibliotheca WorkStation Shielded

F. Staff and public computers (PC-1)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Workroom & Office (Qty: 4)
   b. Seminar Room (Qty: 5)
   c. Teen Area (Qty: 10)
   d. Children's Area (Qty: 10)
   e. Librarian Station #2 (Qty: 1)
   f. Adult Area (Qty: 14)
   g. Main Circulation Desk (Qty: 2)
4. Verify exact requirements with the owner.
   a. HP ProDesk 600 G5 Desktop Mini Business PC (or approved equal)
   b. HP Keyboard and mouse (or approved equal)
   c. HP 24" monitor (or approved equal)
   d. 3 Year HP Business Warranty

G. Color Photocopier (CPR-2)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.

3. Provide the following quantities and locations:
   a. Workroom (Qty: 1)
4. Verify exact requirements with the owner.
   a. Sharp MXC300X (or approved equal)

H. Printer Value Loader (CPR-1B)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Workroom (Qty: 1)
4. Verify exact requirements with the owner.
   a. Intercard Value Loader, PaperCut (or approved equal)

I. B/W Printers (PTR-1)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Workroom Office (Qty: 1)
   b. Main Circulation Desk (Qty: 1)
   c. Library Station #2 (Qty: 1)
4. Verify exact requirements with the owner.
   a. Sharp MX B350W (or approved equal)

J. Public Scanner (DLS-1)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Adult Area (Qty: 1)
4. Verify exact requirements with the owner.
   a. KIC Click Mini (or approved equal)

K. Photocopier (CPR-1A)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Adult Area (Qty: 1)
4. Verify exact requirements with the owner.
   a. Xerox photocopier (or approved equal)

L. OPAC (PC-3)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Teen Area (Qty: 2)
   b. Children's Area (Qty: 1)
   c. Adult Area (Qty: 4)

4. Verify exact requirements with the owner.
   a. HP ProDesk 600 G5 Desktop Mini Business PC (or approved equal)
   b. HP Keyboard and mouse (or approved equal)
   c. HP 24" monitor (or approved equal)
   d. 3 Year HP Business Warranty

M. AWE Computer (PC-2)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Children's Area (Qty: 2)
4. Verify exact requirements with the owner.
   a. AWE Computer (or approved equal)

N. VR Machine (PC-5)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Seminar Room (Qty: 1)
4. Verify exact requirements with the owner.
   a. VR Machine Computer as required to operate Microsoft Hololens 2 64GB Smart Lens (or approved equal).

O. Exterior Kiosk (BRS-2)
1. Provide a complete system including all accessories and equipment items.
2. Coordinate with the owner's IT department for configuration settings and connection to the network.
3. Provide the following quantities and locations:
   a. Exterior (Qty: 1)
4. Verify exact requirements with the owner.
   a. Library Mate 2100 (or approved equal)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Test for proper operation and adjust until satisfactory results are obtained.

3.2 TESTING

A. Configure all equipment in accordance with owner's standard IT configuration requirements.

B. Test equipment for proper operation. Troubleshoot and resolve issues as required.

3.3 TRAINING

A. Provide 4 hours of training on all equipment upon completion of the installation.

END OF SECTION 11 51 00

SECTION 12 24 13

ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Motorized interior roller shades
      a. Regular top down shades
      b. Bottom up slant top
   2. Manual interior roller shades
   3. Shade accessories.
   4. Control systems.
   5. Location on Drawings

1.2 REFERENCE STANDARDS

A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) (www.ansi.org and www.ieee.org):
   1. C62.41-1991 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
   2. D4674 -02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.

B. Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA) (www.nema.org) WD1- 1999 (R2005) - General Color requirements for Wiring Devices.

C. ASTM International (ASTM) (www.astm.org):
   1. D4674-89 - Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.
   2. G21-96 (2002) - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
   3. G22-76 (1996) - Standard Practice for Determining Resistance of Plastics to Bacteria.

D. National Fire Protection Association (NFPA) (www.nfpa.org) 701 (2004) - Standard Methods of Fire Tests for Flame Propagation.

E. Underwriters Laboratories, Inc. (UL) (www.ul.com):
   1. 1310 – Class 2 Power Units.
   2. 508 – Industrial Control Equipment.

1.3 SYSTEM DESCRIPTION

A. Roller Shade System: Ultra-quiet, precision-controlled electronic drive unit contained within head tube, controlling shade movement.

1.4 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings; include:
      a. Shade schedule indicating room number, opening sizes, quantities and key to details.
      b. Head, jamb and sill details, and mounting dimension requirements for each product and mounting condition.
      c. One-line wiring system diagrams including connection details and overall arrangement of shades and control locations.
   2. Samples:
      a. Fabric samples showing each specified color.
      b. Samples showing available color and finish selections for controls.
   3. Product Data; include:
      a. Descriptive literature and details for each product type including materials, finishes, construction, and dimensions of individual components, profiles, and mounting

requirements.

b. Wiring diagrams, details on integration to lighting control systems, AV systems, and building management systems, installation instructions, and operating instructions.

c. Current certificates showing that line voltage components of system are either UL Listed or UL recognized.Include the following paragraph for certification of bacterial and mildew resistance.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Assign responsibility for design, engineering, installation, and performance of window shade system to single manufacturer and their qualified dealers and installers.
   2. Furnish shading system and electrical control equipment for complete installation.

B. Mockups:
   1. Provide mockup of window shade complete with selected shade fabric.
   2. Locate where directed.
   3. Approved mockup may not remain as part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Do not deliver shades until concrete, masonry, plaster, painting, and other wet work is complete and dry.

C. Deliver shades to project in protective packaging, labeled to identify each shade for each opening.

D. Include installation, programming, and maintenance instructions.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions in installation areas within manufacturer’s recommended limits:
   1. Ambient operating temperature: 32 to 104 degrees F.
   2. Humidity: 0 to 90 percent, non-condensing

B. Do not install products under environmental conditions outside manufacturer's absolute limits.

C. Do not install shade system until building is operating at ambient temperature and humidity ranges that are consistent with those intended for buildings ultimate use.

1.8 COORDINATION

A. Coordinate pre-wiring of system utilizing manufacturer’s approved low voltage wiring to each shade drive location.

B. Fabricate shades after obtaining field dimensions for each opening.

C. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

1.9 WARRANTY

A. Provide manufacturer’s 5 year full warranty, 8 years limited parts warranty for defective equipment.

1.10 MAINTENANCE

A. Make ordering of new equipment for expansions, replacements, and spare parts available to qualified dealer or installer.

B. Make replacement parts available for minimum of ten years after date of manufacture.

C. Provide 24-hour, 7-day a week technical support to troubleshoot system wiring and aid in system programming.

D. Offer renewable service contract on yearly basis to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of system startup completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. System Description:
1. Ultra-quiet, precision-controlled electronic drive unit housed inside roller tube, controlling shade movement.
2. Audible noise: Maximum 44 dBA measured 3 feet from electronic drive unit. No audible clicks when motor starts or stops.
3. Operate independently, without use of external group controllers.
4. Control shade speed for tracking within plus or minus 0.0625 inch throughout entire travel.
5. Include 10 year power failure memory for preset stops, open and close limits, shade grouping and subgrouping, and system configuration.
6. Systems with multiple electronic drive units electronically synchronized to start, stop, and move in unison.

B. Grouping:
1. Keypads and contact closure inputs can control any electronic drive unit without separate group controller.
2. System groups and subgroups configured at point of control without rewiring and without access to electronic drive unit.
3. System may contain multiple electronic drive units.

C. Integration:
1. Electronic drive units integrate with lighting controls, when by same manufacturer without interfaces.
2. Contact closure, RS232, and Ethernet interfaces available to interface with audio/visual equipment and security systems.

D. System Performance:
1. One-touch control of shades by means of keypad, lighting control, or infrared remote.
2. Capable of stopping within accuracy of 0.125 inch at any point between open and close limits.
3. Store over 250 programmable stop points, including open, close, and any other position.
4. Presets set by 5-second button push and hold from keypad, lighting control, or handheld remote control.
5. Presets recalled by keypad, contact closure input, infrared receiver, or other lighting control system interface.
6. Open and close limits programmable from electronic drive unit, lighting control, wall-mounted keypad, or handheld remote control.
7. System components electro static discharge protected.

2.2 ROLLER SHADES

A. Mounting:
1. Brackets to provide symmetrical light gaps of 0.75 inch on each side of shade.
2. Roller shade leveling adjustment allowing leveling adjustment while roller shades are mounted to brackets.
3. Allow side-to-side adjustment up to 0.375 inch on each side while shade is mounted to bracket.
4. Projection adjustment up to 0.50 inch.
5. Provide mounting brackets to fit into Bottom Pocket
6. Two-piece mounting bracket providing level, projection, and shade centering adjustments from mounting bracket.
7. Provide dual brackets permit two shades rollers to be mounted in same opening.
8. Coupling:
   a. Single electronic drive unit capable of driving multiple shades with coupling pin.
   b. Pin allows for precision adjustment of bottom bar levels without removing roller from installed point or fabric from roller tube.
9. Bottom Up Slant Top:
   a. Single electronic drive unit capable of driving a Motorized Tension Roller Shade

Bottom Up, Slant Top Shape.
b. Suited for Surface or recessed mount with Spring Cassette and/or Shade Box recessed in window jamb. Designed for use with shade inclined up to 15 degrees from vertical.

B. Shade Tube: Fabric connected to tube using double-sided adhesive strip with minimum of one turn of fabric on roller before working section of fabric starts.
C. Fabric:
1. Pass NFPA 701 large and small scale tests.
2. Fabric selection: E-Screen THEIA 3% Select fabric go to http://www.performanceshadingadvisor.com/
3. Glare Control
a. OF: +/- 0.75%
b. Tv: +/- 20% x Tvmean

2.3 ACCESSORIES
A. Wall Mounted Controls:
1. Low voltage keypads with faceplates attached without visible means of attachments, product color to match NEMA WD1
2. Visible parts ultraviolet color stabilized, tested to ASTM D4674.
3. Electronic drive units powered with 24 VDC from approved power supply; power supply via NEC Class 2 power source.

2.4 SOURCE QUALITY CONTROL
A. Perform full-function testing on completed assemblies prior to shipment.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Install in accordance with manufacturer's instructions and approved Shop Drawings.
B. Install shades to provide smooth operation.
C. Locate controls where directed.
D. Connect to power supply and control wiring.
E. Connect to lighting control audio/visual system if applicable.

3.2 ADJUSTING
A. Adjust level, projection, and shade centering from mounting brackets.
B. Adjust fabric on tube if visibly telescoping.

3.3 DEMONSTRATION
A. Demonstrate proper operation and maintenance of window shade system to Owner.

END OF SECTION 12 24 13

SECTION 12 56 50

FURNITURE

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The Drawings and provisions of the Contract, including Division 1, General Requirements apply to this section.

1.2 DEFINITIONS

A. Library shelving and ancillary freestanding furniture as specified herein and as shown in the drawings.

1.3 SUBMITTALS

A. Custom Furniture shop drawings indicating size, material, and finish.

B. All Fabrics and finishes listed for each item specified.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Those manufacturers listed on the attached furniture specification sheets are approved for use on the project. Other manufacturers must be equal to or exceed the specifications and submit for review and approval by the Architect and the City.

2.2 FURNITURE LIST / SPECIFICATION SHEETS

A. See attached.

PART 3 - EXECUTION (Not Used)

CITY OF SAN DIEGO PACIFIC HIGHLANDS BRANCH LIBRARY

BASIS OF DESIGN (reference specification sheets for detail information)			BIDDERS PROPOSED FURNITURE		PRICING	
CODE	FURNITURE DESCRIPTION	*QTY	FURNITURE DESCRIPTION	QTY	UNIT PRICE	EXTENDED PRICE
D-1	Mobile Desk	1				
D-2	Manager Office Desk	1				
EC-1	Exterior Café Chair	72				
EC-2	Exterior Lounge Seating	2				
EC-3	Exterior Lounge Seating	16				
EC-4	ExteriorCourtyard Seating	12				
EC-5	Add Alternate Exterior Seating	36				
ET-1	Exterior Square Café Table	6				
ET-2	Exterior Round Café Table	11				
ET-3	Exterior Side Table	8				
ET-4	Exterior Side Table	4				
ET-5	Add Alternate Exterior Table	9				
ET-6	Exterior Community Table	1				
FL-1	Floor Lamp	7				
KC-1	Exterior Child Lounge Seating	6				
KT-1	Exterior Kids Table Set	2				
L-1	Lectern	1				
MB-1	Wall Mounted Markerboard	11				
MB-2	Mobile Markerboard	2				
R-1	Waste Receptacle	14				
R-2	Recycle Receptacle	6				
R-3	Exterior Waste Recycling Receptacle	8				
R-4	Waste Receptacle	1				
S-1	Children's Area Lounge Seating	5				
S-2	Teen Area Modular Seating	1				
S-3	Children's Area Lounge Seating	10				
S-4	Teen Area Lounge Seating	7				
S-5	Library Reading Chair	17				
S-6	Community Room Stack Chair	80				
S-7	Children's Area Upholstered Benches	1				
S-8	Light Weight Armless Task Chair	58				
S-9	Staff Task Chair	11				
S-10	Reading Table Seating	25				
S-11	Maker Space Stool	8				
S-12	Armless Stack Chair	40				
S-13	Children's Area Bean Bag Chair	5				
S-14	Children's Area Side Chair	12				
S-15	Upholstered Small Stool	4				
S-16	Armless Bar Stool	10				
S-17	Children's Computer Stool	4				
SH-1	Library Shelving	35				
SH-2	Library Shelving	103				
SH-3	Library Shelving	4				
SH-4	Library Shelving	9				
SH-5	Library Shelving	8				
SH-6	Library Shelving	7				
SH-7	Library Shelving	2				
T-1	Side Table	30				
T-2A	Collaboration Table	1				
T-2B	Collaboration Table	1				
T-3	Powered Reading Table	1				
T-4	Powered Reading Table	2				
T-5	Browsing Table	2				
T-6	Meeting Room Table	2				
T-7	Meeting Room Table	2				
T-8	Meeting Room Table	2				
T-9	Meeting Room Table	1				
T-10	Nesting Table	1				
T-11	Maker Space Mobile Table	6				
T-12	Children's Area Craft Table	3				
T-13	Teen Area Tall Computer Table	1				
T-14	Community Room Multi-Purpose Table	30				
T-15	Break Room Café Table	2				
T-16	Workroom Worktable	1				

* Bidder to cross check quantities listed with plans and verify any discrepancies through RFBI process. If clarification is not received, bid should include larger of the two quantities

TOTAL	
FREIGHT	
DELIVERY & INSTALL	
TAX	

GRAND TOTAL	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: D-1
ITEM: Mobile Desk	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Palmieri or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Mobile Desk on casters MODEL: Navigate #NV-4301-C-M DESCRIPTION: 4301 Series. Mobile unit with 4” diameter swivel caster with brake. Worksurface top and patron ledge to be custom material solid surface quartz. Metal components consists of a 16-gauge non-perforated main panel, and a 16-gauge perforated return panel. The front of the unit has a 1/4” thick custom decorative acrylic panel with stand-off hardware. Grommet and Wire Management are included as standard. FINISH: Top: Caesarstone #6141 Ocean Foam Metal Paint color #1: Black Sandtex N31 Metal Paint color #2: Black Sandtex N31 Decorative Acrylic Panel: 3Form – Tribe Seagrass SIZE: 24” w x 48” l x 30” / 36” H	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: D-2
ITEM: Manager Office Desk	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: TBD REP: TBD PHONE NUMBER: TBD EMAIL: TBD	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Manager Office Desk and Storage Furniture MODEL: TBD DESCRIPTION: include allowance for Office to include as a basis of pricing, desk with storage pedestal, return, back storage credenza with overhead storage, task lighting and fabric wrapped tackboard, and tall wardrobe / storage unit. Reference plan for approximate layout and dimensions. Final requirements to be determined by library staff prior to order. FINISH: Wood Laminate top and casework storage Dimensions: per plan	 PHOTO FOR GENERAL DESIGN – ACTUAL CONFIGURATION AND REQUIREMENTS TO BE DETERMINED BY LIBRARY STAFF

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: EC-1
ITEM: Exterior Café Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Café Chair MODEL: Avivo Stacking Chair #SCAVO DESCRIPTION: Chair frame is cast aluminum; seat and back are formed aluminum. Powdercoat colors have been formulated to be ultra-durable for improved long-term wear and resistance to weathering. Powdercoat colors are also anti-graffiti, allowing marks from paint, permanent markers, and dirt to be easily removed. Seat and back to be perforated in pattern – Riva. UV-stabilized, wear-resistant polypropylene bumpers are included on the underside of each chair to protect when stacking. FINISH: Powdercoat color: Aluminum Texture SIZE: 23” d x 19” w x 19” sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: EC-2
ITEM: Exterior Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Loll Designs or approved equal WEBSITE: https://lolldesigns.com/products/adirondack-chair-flat/	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Adirondack Chair MODEL: AD-4SFC-CG DESCRIPTION: modern 4-Slat Flat Adirondack Chair. Made of 5/8 thick, 100% recycled high-density polyethylene (HDPE). Hidden fasteners FINISH COLOR: Charcoal Grey SIZE: 34.75” d x 28.5” w x 33.25” h – 12” sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: EC-3
ITEM: Exterior Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Babmar or approved equal REP: Heidi Creekmur H Design Source PHONE NUMBER: 858.945.7915 EMAIL: hdesignsource@gmail.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Lounge Chair MODEL: Amber Club Chair #WA1043-1BM004 DESCRIPTION: Heavy gauge powder coated aluminum frame. Professionally welded heavy gauge aluminum frames guaranteed not to rust UV and scratch resistant Akzo Nobel powder coat paint finish from the Netherlands. Quick dry open cell foam cushions for fast drying. Foam is breathable, permeable and anti-molding. Sunbrella outdoor fabric guaranteed not to fade, mold or mildew. FINISH: Frame color: Gray UPHOLSTERY FABRIC: manufacturer: Sunbrella pattern: Canvas color: TBD grade: com SIZE: 35.5” D x 30” W x 24” h – 19” overall SH	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: EC-4
ITEM: Exterior Courtyard Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Janus et Cie or approved equal REP: Cindy Andera Janus et Cie PHONE NUMBER: 714.458.9128 EMAIL: Cindy Andera candera@janusetcie.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Stackable Side Chair MODEL: Forest #711-50-061-01-00 DESCRIPTION: Powder coated die cast aluminum seat and back. Tubular aluminum legs. Stacks 4 high. FINISH: Frame color: White SIZE: 21.5” d x 19” w x 32” h – 17.5” sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: EC-5
ITEM: Add Alternate Exterior Seating	QUANTITY: Per Add Alternate Plan, Sheet LC-1.5
MANUFACTURER: Landscape Forms or approved equal REP: Gordon Grant Grant + Associates PHONE NUMBER: 858-560-1070 EMAIL: Gordon Grant gordon@ggrantassociates.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Stackable Armless Chair MODEL: Parc Centre DESCRIPTION: Parc Centre chairs comfortably support social activities in formal and informal settings alike. Steel construction coupled with economy of form make them nimble enough to move around and heavy enough to hold their ground. Sled bases are stable on grass, gravel or hard surfaces. Seats have a pleasing bounce. Chair frame is formed of heavy steel wire. The seat and back panels are constructed of welded steel straps Seating is lightweight and stacks horizontally. Stacking bumper/glides are made of tough nylon to resist damage from dragging on rough surfaces. Polyester powdercoat is a hard yet flexible finish that resists rusting, chipping, peeling, and fading. FINISH: Powdercoated Metal -Designer Palette Architectural Series – Color: Obsidian SIZE: 21” d x 19” w x 33” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-1
ITEM: Exterior Square Café Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Square Café Table MODEL: Avivo Table #STAVO-T4040A DESCRIPTION: Table frame is extruded aluminum with cast aluminum legs. Powdercoat colors have been formulated to be ultra-durable for improved long-term wear and resistance to weathering. Powdercoat colors are also anti-graffiti, allowing marks from paint, permanent markers, and dirt to be easily removed. Table top to be aluminum inset with perforated pattern – Riva. FINISH: Powdercoat color: aluminum texture SIZE: 40” d x 40” w x 29.5” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-2
ITEM: Exterior Round Café Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Round Café Table MODEL: Avivo Table #STAVO-C42R DESCRIPTION: Table frame is extruded aluminum with cast aluminum legs. Powdercoat colors have been formulated to be ultra-durable for improved long-term wear and resistance to weathering. Powdercoat colors are also anti-graffiti, allowing marks from paint, permanent markers, and dirt to be easily removed. Table top to be aluminum inset with perforated pattern – Riva. FINISH: Powdercoat color: Aluminum Texture SIZE: 42” diam. x 30” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-3
ITEM: Exterior Side Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Babmar or approved equal REP: Heidi Creekmur H Design Source PHONE NUMBER: 858.945.7915 EMAIL: hdesignsource@gmail.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Side Table MODEL: Amber Square Table #WA2035M DESCRIPTION: Heavy gauge powder coated aluminum frame. Tempered glass top. FINISH: Frame finish: Gray Top finish: TBD SIZE: 24” W x 24” D x 15-3/4” H	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-4
ITEM: Exterior Side Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Loll Designs or approved equal WEBSITE: https://lolldesigns.com/products/adirondack-chair-flat/	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Side Table MODEL: Satellite End Table #SA-ER18-CG DESCRIPTION: Tables are made of 100% recycled high-density polyethylene (HDPE). All joinery are aluminum inserts mated with a 304 grade stainless steel bolt. FINISH: Charcoal Grey SIZE: 18” diam. X 16”h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-5
ITEM: Add Alternate Exterior Table	QUANTITY: Per Add Alternate Plan, Sheet LC-1.5
MANUFACTURER: Landscape Forms or approved equal REP: Gordon Grant Grant + Associates PHONE NUMBER: 858-560-1070 EMAIL: Gordon Grant gordon@ggrantassociates.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Cafe Table MODEL: Parc Centre 24” Round DESCRIPTION: Steel construction coupled with economy of form make them nimble enough to move around and heavy enough to hold their ground. The table’s sleek top reads like a fine line but provides the strength and durability of solid steel. Leveling glides on the steel plate base make it stable on varied surfaces. Tabletops are formed of solid 5/16" steel plate welded to heavy duty steel wall tubing support. Base plate is 17" diameter solid steel. Table is freestanding with adjustable levelers All parts are powdercoated Polyester powdercoat is a hard yet flexible finish that resists rusting, chipping, peeling, and fading. FINISH: Powdercoated Metal -Designer Palette Architectural Series – Color: Obsidian SIZE: 24” diam. X 30” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: ET-6
ITEM: Exterior Community Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Quick Crete Products Corp. or approved equal PHONE NUMBER: 866-703-3434 Website: https://qcp-corp.com/	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Community Table - custom MODEL: Quote #0144423 DESCRIPTION: Top: custom eduracast table top, polished table top ameripolish SR-2 Base: custom brushed stainless steel base with intermediate support Approximate weight 990 lbs FINISH: TBD SIZE: Top: 44” W x 144” L x 2” thick Base: 28” SQ x 116” L x 3” thick	**NO IMAGE AVAILABLE**

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: FL-1
ITEM: Floor Lamp	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Herman Miller or approved equal REP: Cheryl LaLetta GM Business Interiors PHONE NUMBER: 619-203-5754 EMAIL: claletta@gmbi.net	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Nelson Medium Pear Lotus Floor Lamp MODEL: H770LF-M-BNS DESCRIPTION: Part of the Nelson Bubble Lamp series, the Nelson Pear Lotus Floor Lamp has a shape that flares at the center. It has a 10"-diameter brushed nickel-plated steel stand with a 61 /2-pound base for stability Base is brushed nickel. The lamp has an on/ off floor switch and a 9' cord. Ships with bulb included. 150W/120V. FINISH: Shade: Plastic Polymer Base: Brushed Nickel SIZE: 17” diam. x 57-1/2“ h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: KC-1
ITEM: Exterior Child Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Loll Designs or approved equal WEBSITE: https://lolldesigns.com/products/adirondack-chair-flat/	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Adirondack Chair MODEL: KD-AD-LG DESCRIPTION: modern 2-slat kids Adirondack Chair, sized for children ages 1-10. Made of 5/8 thick, 100% recycled high-density polyethylene (HDPE). Hidden fasteners FINISH COLOR: Leaf Green SIZE: 25.25” d x 20” w x 22.75” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: KT-1
ITEM: Exterior Kids Table Set	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Loll Designs or approved equal WEBSITE: https://lolldesigns.com/products/adirondack-chair-flat/	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Exterior Kids Table Set MODEL: Chairs: KD-BBO2C-DW Table: KD-PT-CG DESCRIPTION: BBO2 kids plastic outdoor chair and table - sized for children. Made of 5/8 thick, 100% recycled high-density polyethylene (HDPE). Hidden fasteners Note: each set to include 1 table and 4 chairs FINISH COLOR: Chairs: driftwood Table: charcoal grey SIZE: Chairs: 13.25” d x 13.25” w x 23” h Table: 34” diam. x 22” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: L-1
	DATE:
ITEM: Lectern	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Coalesse or approved equal REP: Rebecca Hetter Coalesse PHONE NUMBER: 619.972.2953 EMAIL: Rebecca.Hetter@steelcase.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Lectern MODEL: Exponents Lectern #COCL42-PVD DESCRIPTION: Lectern top shelf is 14-1/4" D x 23-1/2" W x ½" thick. The angle of the shelf is 8-1/2 degrees. It has an integrated aluminum pencil / paper stop for holding documents, which is painted to match the finish of the base – platinum matte. The lectern top shelf has a maximum recommended load of 45 pounds. The top flip lid has a cutout for easy opening and cable routing. The lid opens toward the top shelf and comes standard with two 160 degree hinges to access power, voice and data or storing cords and cables. The back panel is removable by lifting-up and out. The panel has for small aluminum cleats for easy removal and installation when access to wire management is required. The cords can exit or enter from wither side of the lectern at the bottom Four nylon glides are standard for easy movement when required. The glides are ¼" thick and 3" in diameter. Metal base is 17" D X 23-1/2" W X 3/8" thick is painted - platinum matte. Power and Data: 2 power receptacles, 2 data, and 1 VGA with audio FINISH: Painted MDF #V197 Black SIZE: 18-3/4" d x 23-1/2" w x 48"	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: MB-1
ITEM: Wall Mounted Markerboard	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Peter Pepper Products or approved equal REP: Jamie Ziemer Contract Connection PHONE NUMBER: 949.648.0917 EMAIL: jamie@contractconnection.net	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Wall Mounted Markerboard MODEL: MiniMint Model MMLMB72361 DESCRIPTION: White porcelain enamel writing surface fused to 28-gauge steel. Writing surface accepts magnetic accessories. Frame is 13/16" Mini-Aluminum Quarter Round Included in order: Full-Length Aluminum Pen Rail; (4) Dry-Erase Marking Pens; (1) Eraser included. Wall mounting cleat/bracket and hardware. FINISH: Frame Finish: RA - Natural Anodized Aluminum SIZE: 36” h x 72” w	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: MB-2
ITEM: Mobile Markerboard	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Peter Pepper Products or approved equal REP: Jamie Ziemer Contract Connection PHONE NUMBER: 949.648.0917 EMAIL: jamie@contractconnection.net	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Mobile Markerboard MODEL: MeetUp Easel #ME36 DESCRIPTION: Ideal for those meetings that pop up around the office, the MeetUp mobile easel has dual writing surfaces and storage. Writing surface: steel, magnetic with a specially formulated premium quality polyurethane powder coating that provides a high quality dry-erase finish. Extremely smooth and tough, resistant to chemicals and solvents. Writing surface accepts magnetic accessories. 3” locking casters. Four dry erase markers and eraser included. FINISH: Base finish: graphite SIZE: 28” d x 36” w x 73”h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: R-1
ITEM: Waste Receptacle	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Waste Receptacle MODEL: Triad #SLTRD-16L DESCRIPTION: Triad waste receptacles are available with 8" diameter top-opening configuration with a 16-gallon triangular bodies. Stainless steel body comes standard in high durability finish. Standard lid is molded from polyethylene with a UL94HB fire rating available in a light texture. Graphics are printed on the back of clear, lightly textured polycarbonate, protecting them from wear over time. Triad uses replaceable internal liners designed to be used with or without plastic litter bags. Liners are molded from durable black polyethylene with a UL94HB fire rating. Environmental: Triad uses up to 66% recycled content. All components are fully recyclable. Stainless steel construction ensures a long product life cycle. Low maintenance. FINISHES: Body Finish: Sandstone Polyethylene Lid: Black Graphic: Litter SIZE: 15.5" d x 17.6" w x 31.9" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: R-2
ITEM: Recycle Receptacle	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Recycle Receptacle MODEL: Triad #SLTRD-16P DESCRIPTION: Triad recycle receptacles are available with 9.5" triangular top-opening configuration with a 16-gallon triangular bodies. Stainless steel body comes standard in high durability finish. Standard lid is molded from polyethylene with a UL94HB fire rating available in a light texture. Graphics are printed on the back of clear, lightly textured polycarbonate, protecting them from wear over time. Triad uses replaceable internal liners designed to be used with or without plastic litter bags. Liners are molded from durable black polyethylene with a UL94HB fire rating. Environmental: Triad uses up to 66% recycled content. All components are fully recyclable. Stainless steel construction ensures a long product life cycle. Low maintenance. FINISHES: Body Finish: Sandstone Polyethylene Lid: Black Graphic: Recycling SIZE: 15.5" d x 17.6" w x 31.9" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: R-3
ITEM: Exterior Waste Recycling Receptacle	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Forms + Surfaces or approved equal REP: Kelly McKeown Forms + Surfaces PHONE NUMBER: 619.991.1838 EMAIL: Kelly.McKeown@forms-surfaces.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Waste / Recycling Receptacle MODEL: Apex #SLAPX-36S with rain cover DESCRIPTION: Apex Receptacle, 36-gallon, split stream stainless steel with aluminum rain cover Split-stream receptacles have two 18-gallon half liners to accommodate two separate litter and/ or recycling streams. Overall capacity is 36 gallons. Liners are molded from durable black low-density polyethylene (LLDPE) with a UL94HB fire rating. Lid and body are made of corrosion resistant aluminum with a powdercoat finish Rustproof aluminum construction ensures a long product life cycle. Hinged side access doors for easy servicing Environmental: All Apex Receptacle metal components are fully recyclable Standard powdercoat finishes are no-VOC FINISHES: Stainless Steel Body Finish: Sandstone Powder Coat: Slate Texture Graphic: Litter Black / Recyling Blue SIZE: 32” W x 15” D x 32” H	Image shown does not match specification Inserts to be stainless steel not wood 

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: R-4
ITEM: Waste Receptacle	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Suncast Commercial or approved equal Website: https://www.suncastcommercial.com/waste-management/indoor-decorative-metal-trash-cans/8-gallon-metal-crescent-indoor-trash-can.html	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Waste Receptacle MODEL: #MTCRES801 DESCRIPTION: 8 Gallon metal crescent indoor trash can Heavy-duty construction to withstand everyday use Stainless steel rim and stainless steel base Rigid metal liner included is removable for an easy cleanup The flat rear panel allows the can to sit flush against walls or other structures Designed to fit in areas where space may be limited FINISHES: Body Finish: Stainless Steel SIZE: 13.2” W x 6.7” D x 27.53” H	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-1
ITEM: Children's Area Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Lounge Chair MODEL: Zip Single Seat #5870CL DESCRIPTION: Zip is fully upholstered with flange stitch detailing and handles attached to the back. Handles are custom alternate leather. Non-slip fabric applied to bottom. Environmental: Seating is GREENGUARD Certified FINISHES: CONTRASTING HANDLE: manufacturer: bernhardt textiles pattern / color: excel 3835-030 lichen FABRIC: manufacturer: bernhardt textiles pattern / color: swing 3504-943 lagoon grade: 6 SIZE: Overall: 34" d x 30.5" w x 25.5" h Seat depth: 24"	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-2
ITEM: Teen Area Modular Seating	QUANTITY: (individual quantities shown below)
MANUFACTURER: Kimball or approved equal REP: Gerhard Stadel Kimball PHONE NUMBER: 949-230-9173 EMAIL: gerhard.stadel@kimball.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Teen Area Modular Seating MODEL: Pairings Perch Seating One seat mid perch #K82P1MS – qty 2 One seat low perch #K82P1LS – qty 2 Inside corner mid perch #K82P90IMS – qty 1 Free standing divider wall with solid surface work shelf #K82WFS5441USOH – qty 1 Provide all hardware for connection of modular group DESCRIPTION: Pairings merges simple lounge collections with the more informal space where people work, team up, and gather, creating adaptable, multi-level lounge-based work settings that host teams and technology in comfort. Pairings is a family of components that can be crafted together to create formal or informal settings in support of today's work-play-gather environments. Low, Mid and Corner sections easily come together to create configurations that fit any open plan setting A divider wall takes on a new dynamic with a work shelf for casual meetings areas. Sustainability - Conforms to the ANSI/BIFMA e3-2014e Furniture Sustainability Standard / Level 2 Indoor Air Quality Certified Gold	 FINISHES: SOLID SURFACE WORK SHELF: 405 Designer White DIVIDER WALL FABRIC: manufacturer: Pallas Textiles pattern / color: alea 27.293.021 cocoa grade: COM MODULAR PERCH FABRIC: manufacturer: Carnegie Fabrics pattern / color: Maxwell Print 6380-113 grade: COM

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-3
ITEM: Children's Area Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Area Lounge Seating MODEL: Mitt #5720L DESCRIPTION: Loop Master Stitch with Handle. Mobile chair with four weight-activated self-locking casters. Environmental: Seating is Level 2 and GREENGUARD Certified FINISHES: LOOP MASTER STITCH SPECIFICATION: TBD Thread color must be specified. The same thread color will be used for the chair and handle. CONTRASTING HANDLE: manufacturer: bernhardt textiles pattern / color: excel 3835-030 lichen FABRIC: manufacturer: bernhardt textiles pattern / color: mirage 3529-033 forest grade: 9 SIZE: 33.5" d x 33.5" w x 32" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-4
ITEM: Teen Area Lounge Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Hightower or approved equal REP: Leza Hutchinson Level West PHONE NUMBER: 619-417-4500 EMAIL: Leza Hutchinson leza@levelwestreps.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Teen Area Lounge Seating MODEL: Gimbal Highback Rocker #HT4100 DESCRIPTION: The Lounge Rocker was built with just enough movement to expel energy, allowing for a longer duration of sit. A cure for the common fidgeter, the subtle movement boosts focus, memory and attention, while the high-back offers privacy for the perfect heads-down work session. the rocker provides the perfect pivot to not only rock but swivel as well. The base is an additive cap that adds an integrated swivel movement with no mechanism. It mirrors the geometry of the chair and is engineered to be rigid and support movement on a range of floor types, while protecting upholstery from direct contact with the floor. Environmental: Seating is Indoor Advantage Gold Certified. Seating is Red List Free BACK PILLOW AND SEAT FABRIC: manufacturer: bernhardt textiles pattern / color: venture 3484-943 ocean grade: com INSIDE AND OUTSIDE BACK FABRIC: manufacturer: hbf textiles pattern / color: ms. quilty 1002-67 tranquil grade: com SIZE: 38.25” d x 37” w x 48” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-5
ITEM: Library Reading Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Fritz Hansen or approved equal REP: Annie McKenna Fritz Hansen PHONE NUMBER: 415.290.8881 EMAIL: anha@fritzhansen.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Reading Chair MODEL: Ro Lounge #JH2 DESCRIPTION: The shell of the chair is created in hard polyurethane foam with fiberglass reinforcements along the edges. The seat cushion for the chair is made of molded polyurethane foam to achieve the right form and comfort. The back cushion on the chair is made of two slices of soft foam with a lumbar support to increase ergonomics and comfort. The neck cushion is a construction of form-pressed veneer with a super soft foam on top. It is mounted with two fittings and it is therefore possible to order and change the entire neck cushion. The base comes with four legs made of solid oak. Each leg has nylon glides suitable for most flooring types. ENVIRONMENTAL: Seating is GreenGuard Gold certified FINISH: Wood legs: Solid Oak – clear finish SHELL FABRIC: manufacturer: maharam pattern / color: reef 466332-004 fin grade: grade 2+ SEAT AND BACK INSIDE CUSHION FABRIC: manufacturer: kvadrat pattern / color: divina mélange 460830-971 grade: category 2 SIZE: 38.2” d x 31.5” w x 44.5” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-6
ITEM: Community Room Stack Chair	QUANTITY: 80 (per library staff requirements)
MANUFACTURER: Davis or approved equal REP: Jamie Ziemer Contract Connection PHONE NUMBER: 949.648.0917 EMAIL: jamie@contractconnection.net	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Community Room Stack Chair MODEL: A Chair #AC-1010-PL AC-Ganging-AL Hand Cart - #AC-Cart (qty 8) DESCRIPTION: All-plastic chair offers supreme durability in high traffic areas with continual use. plastic seats have increased flexibility in comparison to typical hard-shell chairs Shell is made of injection molded polypropylene plastic. Base is made of glass fiber reinforced thermoplastic polyamide. All chairs are standard with plastic multi-purpose surface glides. Armless chairs have ganging devices, linking the chairs at the base without detracting from the elegant design. Plastic frames are equipped with stacking bumpers. the A-Chair conveniently stacks 15 high from the floor and 10 high on a cart. ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold FINISH: Plastic Shell: ACS-Stone Plastic Base: ACB-Stone SIZE: 20” d x 20” w x 31” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-7
ITEM: Children's Area Upholstered Benches	QUANTITY: (individual quantities shown below)
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Area Upholstered Benches MODEL: Colours model numbers and quantity below #colours 6 4836 – quantity 2 #colours 9 4839 – quantity 1 #colours 10 4840 – quantity 1 #colours 8 4838 – quantity 1 DESCRIPTION: Colours is a modular seating product comprised of unique modules which may be used interchangeably to create an unlimited number of configurations. Fully upholstered benches with saddle stitch detail. When ordering multi-item configurations, please provide the total yardage from the same dye lot in a continuous roll. ENVIRONMENTAL: Seating is GREENGUARD and Level 1 Certified. FABRIC: manufacturer: bernhardt textiles pattern / color: forte3502-903 grass grade: 10 OVERALL SIZE: 230" d x 82" w x 16.5" sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-8
ITEM: Light Weight Armless Task Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Steelcase or approved equal REP: Heather Young Steelcase PHONE NUMBER: 858.207.7600 EMAIL: hyoung2@steelcase.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Light Weight Armless Meeting Chair MODEL: Cobi #434110 DESCRIPTION: Flexing fingers in back promote movement and provide support for a wide range of postures, conforming to the user. Flexible seat edge on all 3-sides supports multiple postures while relieving thigh pressure. Weight-activated mechanism provides support by automatically responding to the user's movements. Five-arm base is standard. Seat height adjusts with a 5" range from 15 1⁄2"H to 20 1⁄2"H with a pneumatic adjustment mechanism. Casters have hard, dual wheels that roll smoothly on carpets ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold SEAT FABRIC: manufacturer: steelcase pattern / color: cogent: connect – 5S25 graphite grade 2 BACK FABRIC: manufacturer: steelcase pattern / color: connect 3D – 5025 graphite grade 2 FINISH: Outer Shell: near black 6295 Base: black SIZE: 19" d x 18.75" w x 19.5" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-9
ITEM: Staff Task Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Steelcase or approved equal REP: Heather Young PHONE NUMBER: 858.207.7600 EMAIL: hyoung2@steelcase.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Staff Task Chair MODEL: Gesture Wrapped Back #442A40 DESCRIPTION: Core equalizer provides just the right amount of lumbar support in any angle of recline. 3D LiveBack moves with the shape of the user's spine as sitting positions change. Variable back stop with four positions is standard. Pneumatic adjustment mechanism is standard. It adjusts with a 5" range. Arms - depth can retract 2-1⁄8" to allow user to get closer to worksurface and into tight corners; width can adjust parallel from 10-1⁄4" to 22- 1 /2" for forearm and elbow support; height can adjust 4-1/4" for arm and elbow support; 360° of motion to give arm support where it is needed with one release Seats - depth adjusts 2-3/4" to accommodate various leg lengths; passive edge angle allows the front edge of the seat to flex 1 1⁄2" to relieve pressure under the user's thighs; perimeter is made of flexible elastomer that provides comfort to larger users and allows alternative postures ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold FINISH COLOR SCHEME: Light/Light FABRIC: manufacturer: Steelcase pattern/color: Cogent: Connect - #5S26 Licorice grade: 2 SIZE: 23" d x 24" w x 40" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-10
ITEM: Reading Table Seating	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Davis or approved equal REP: Jamie Ziemer Contract Connection PHONE NUMBER: 949.648.0917 EMAIL: jamie@contractconnection.net	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Reading Table Seating MODEL: Sachet Low Back #SA-1070-WW DESCRIPTION: Sachet ushers in a new generation of seating with an innovative seat suspension system and flexible back construction providing long-lasting comfort and durability. Seat & Arms Molded polyurethane foam over steel frame. Contrasting welt to be a solid color fabric. Four-Leg Wood Base - Oak and Walnut finishes. ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold ANSI/BIFMA Furniture Sustainability Std -level 1 FINISH: Wood legs: WW400 Light Walnut FABRIC: manufacturer: Carnegie pattern/color: Equinox #6568-3 grade: D SIZE: 24.25” d x 26.75” w x 31.5” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-11
ITEM: Maker Space Stool	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Versteel or approved equal REP: Mary Vilotti Fine Lines PHONE NUMBER: 949.274.1099 EMAIL: mary@finelinesrep.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Maker Space Stool MODEL: The Maker Project Stool #MKL-67S18 DESCRIPTION: Utility stool with static birch wood seat and studio steel legs with distinct nylon glides, standard on every stool. FINISH: Wood seat: Russian Birch Metal legs: clear matte SIZE: 14” diam. x 18” sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-12
ITEM: Armless Side Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Stylex or approved equal REP: Sheryl Gayeski Level Lines PHONE NUMBER: 630-258-4848 EMAIL: sgayeski@levellines.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Armless Stacking Side Chair MODEL: Verve #VR1011012TSPG DESCRIPTION: Verve provides outstanding comfort based on the shell's built-in lumbar support and inherent flex, both of which promote healthy sitting and movement. Plastic shell is injection-molded, recyclable polypropylene. All aluminum components are recyclable cast aluminum. Four-leg tube frames are 5/8" diameter, 13-gauge steel. Stacks 8 high. ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold ANSI/BIFMA Furniture Sustainability Std -level 1 FINISH: Plastic Shell: dark grey Metal legs: textured slate SIZE: 19" d x 19" w x 33" h – 18" sh	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-13
ITEM: Children's Area Bean Bag Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Jaxx Living or approved equal 2745 Bankers Industrial Dr. Atlanta GA 30360 PHONE NUMBER: 866.384.2802 EMAIL: service@jaxxliving.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Area Bean Bag Chair MODEL: Saxx #10003jr DESCRIPTION: Kids 3 foot bean bag chair is eco-friendly and has a removable, machine-washable cover that is easy to clean. Shredded ecofoam filling for maximum comfort. the inner rip stop liner with child-proof zipper, keeps all the foam contained and moisture and dirt out. FABRIC: pattern: microsuede color: blueberry SIZE: 36" d x 36" w x 28" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-14
ITEM: Children's Area Side Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Knoll Studio or approved equal REP: Linda Kayne Robb Knoll PHONE NUMBER: 818.640.6059 EMAIL: Linda_Kayne-Robb@knoll.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Area Side Chair MODEL: Risom #666CS-WB-HB-BC DESCRIPTION: Armless child side chair with webbed back and seat. Nylon webbing straps are 60% nylon and 40% cotton with water repellent finish. Frame is solid Beech hardwood with mortise and tenon construction. Catalyzed lacquer finish ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold Chair is compliant with Consumer Product Safety Improvement Act of 2008 for Children's Products for Total Lead in Substrates and Surface Coating FINISH: Wood frame: Honey Beech WEBBING: color: Blue SIZE: 15.5" d x 13" w x 13.25" sh (overall height – 23")	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-15
ITEM: Upholstered Small Stool	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Upholstered Small Stool MODEL: Colours #13 4843 DESCRIPTION: Non-connecting module Colours stool – freestanding. Fully upholstered stool with saddle stitch detail. ENVIRONMENTAL: Seating is GREENGUARD and Level 1 Certified. FABRIC: manufacturer: bernhardt textiles pattern / color: forte3502-903 grass grade: 10 SIZE: 22.5” d x 22.5” w x 17.5” sh	

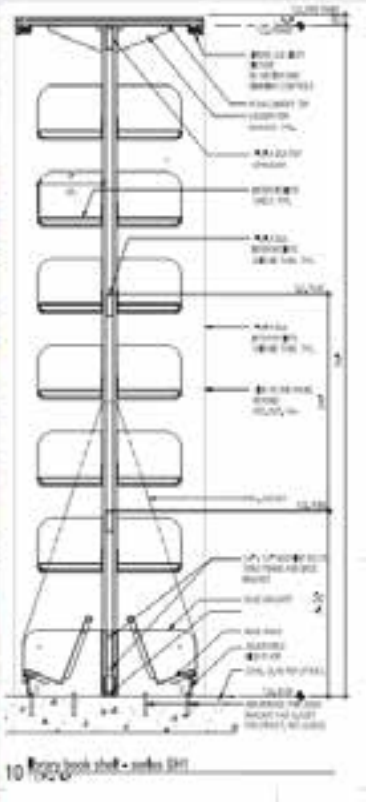
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-16
ITEM: Armless Bar Stool	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Stylex or approved equal REP: Sheryl Gayeski Level Lines PHONE NUMBER: 630-258-4848 EMAIL: sgayeski@levellines.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Armless Bar Stool MODEL: Verve #VR7011007TSPG DESCRIPTION: Verve provides outstanding comfort based on the shell's built-in lumbar support and inherent flex, both of which promote healthy sitting and movement. Plastic shell is injection-molded, recyclable polypropylene. All aluminum components are recyclable cast aluminum. Four-leg tube frames are 5/8" diameter, 13-gauge steel. ENVIRONMENTAL: Indoor Air Quality Certified – Indoor Advantage Gold ANSI/BIFMA Furniture Sustainability Std -level 1 FINISH: Plastic Shell: green Metal legs: textured slate SIZE: 19" d x 19" w x 46"h (30.6"sh)	

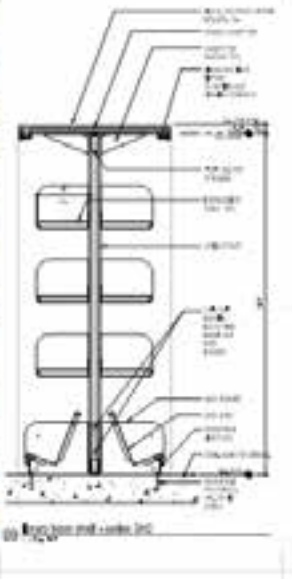
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: S-17
ITEM: Children's Computer Side Chair	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: TMC Furniture or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Computer Side Chair MODEL: Flick Chair – Child #SFLC11315SQ-CT/FLI.D-111-A-PF11-B DESCRIPTION: Shell: Molded plywood square back with select North-American rotary-cut maple veneer. CurThru: Back panel to have CutOut design that leaves a void you can see through Flight Series – FLI.D Dragonfly The colored wood finishes are achieved with aniline dyes and wood pigments with at least two coats of state-of-the-art lacquer and UV protectant. This provides a very durable finish that is resistant to staining and scratching. Base: Constructed of 7/16"solid steel rod finished with electrostatically applied epoxy paint. Glides: Nylon Notes: Stacks up to 10 high FINISH: Maple wood seat and back: toner wood finish: #80 Lime Metal base: powdercoat finish #A-PF11 Black SIZE: 18" d x 16" w x 15" sh (overall height – 28")	

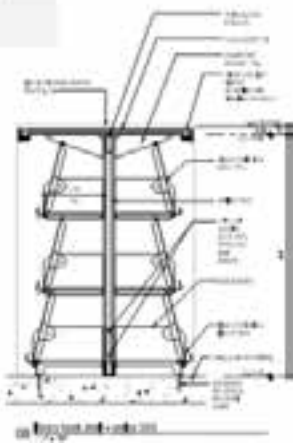
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-1
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving with integrated led light shelves and custom graphic 3form varia end panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include integral LED light (as shown in attached section detail) and custom 3form end panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)  SH-1 section detail  Example of integrated LED lighting 

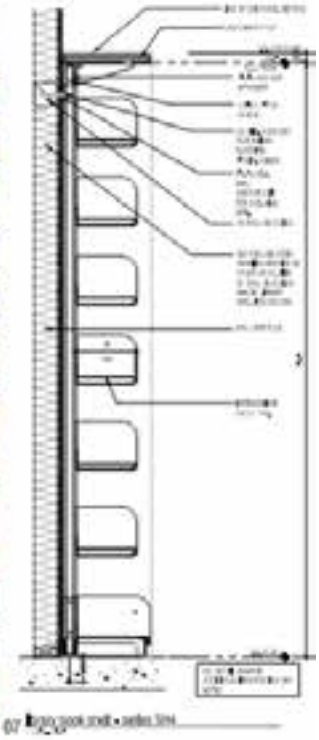
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-2
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving with integrated led light shelves and custom graphic 3form varia end panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include integral LED light (as shown in attached section detail) and custom 3form end panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)  SH-2 section detail  Example of integrated LED lighting

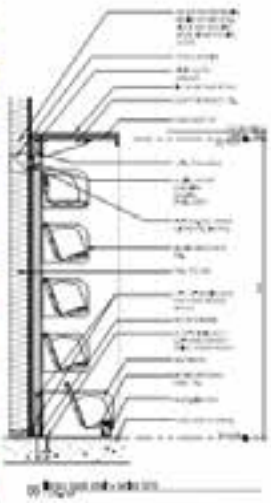
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-3
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving with integrated led light shelves and custom graphic 3form varia end panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include integral LED light (as shown in attached section detail) and custom 3form end panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)  SH-3 section detail   Example of integrated LED lighting

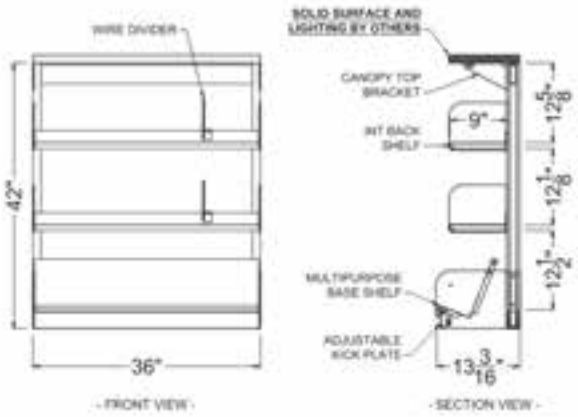
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-4
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving with integrated led light shelves and custom graphic 3form varia end panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include integral LED light (as shown in attached section detail) and custom 3form end panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)  SH-4 section detail  Example of integrated LED lighting 

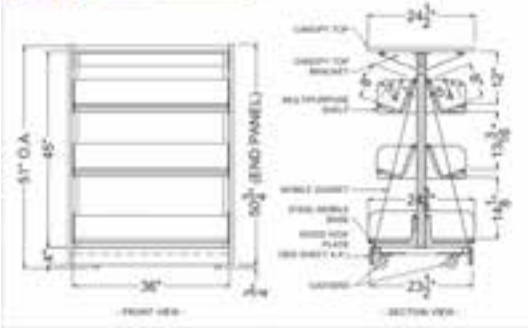
PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-5
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving with integrated led light shelves and custom graphic 3form varia end panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include integral LED light (as shown in attached section detail) and custom 3form end panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)  SH-5 section detail   Example of integrated LED lighting

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-6
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Library Shelving DESCRIPTION: Metal Library Shelving. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. Height and width dimensions to be field verified and coordinated with millwork opening For additional detailed information regarding shelving reference sheet no. 07/A761 in the architectural construction document set.	 Elevation and Section of SH-6

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: SH-7
ITEM: Library Shelving	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Yamada Enterprises or approved equal REP: Linda Braverman Yamada Enterprises PHONE NUMBER: 714.843.9882 x12 EMAIL: linda@yamadaenterprises.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Mobile Library Shelving DESCRIPTION: Mobile Metal Library Shelving with casters and custom graphic 3form varia end and top panels,. Layout, quantity, height and shelving type per furniture plan and architectural details, as approved by library staff. End and Top Panels: custom graphic image on 3form Varia product. graphic images to be provided by architect for dealer coordination with 3 form. Dealer to provide mock-up and submittal to be reviewed and approved by architect, prior to ordering. Shelving pricing **must** include custom 3form end and top panels. For additional detailed information regarding shelving reference sheet no. A766 in the architectural construction document set.	Example of 3form end panels (not final image)   Elevation and section of SH-7

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-1
ITEM: Side Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Stylex or approved equal REP: Rick Gayeski Level Lines PHONE NUMBER: 630-258-4848 EMAIL: rgayeski@levellines.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Side Table MODEL: Adorn #ADB20TST17MTTS DESCRIPTION: Medium height side table. Tops - visible perimeter edge of each top is 3/8" above the base frame. Overall thickness of top is 3/8" steel tops. Steel tops have a simple but elegant rolled formed edge. Attachment of tops is done through a simple hardware connection. Bases are comprised of three steel rods, 3/8" in diameter, formed then welded together to create a unique framed appearance. Nylon glides – color to coordinate with frame color specified. ENVIRONMENTAL: GreenGuard Gold certified Conforms to ANSI/BIFMA Furniture Sustainability Standard – Level 1 FINISH: Metal top: textured slate Metal base: textured slate SIZE: 17" diam. X 20" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-2A
ITEM: Collaboration Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Collaboration Table MODEL: Parma Panel Table #PRML2472 - custom DESCRIPTION: Parma panel tables feature a 3" thick wood frame covered on all sides with high pressure laminate. Laminate and phenolic backing are glued with water-based adhesives. Parma panel bases feature a steel frame under structure consisting of completely welded U-shape weldments for extra strength and stability. Table frame is CARB Phase I & Phase II Compliant. Tables 72" and over will have steel stretcher bars installed within the table top for added stability. Steel glides are factory installed and included on all Parma tables - standard ENVIRONMENTAL: Greenguard Certified – Low Chemical Emissions FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede SIZE: Overall Dimension 24” d x 72” w x 30” h (custom height)	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-2B
ITEM: Collaboration Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Collaboration Table MODEL: Parma Panel Table #PRML2472 - custom DESCRIPTION: Parma panel tables feature a 3" thick wood frame covered on all sides with high pressure laminate. Laminate and phenolic backing are glued with water-based adhesives. Parma panel bases feature a steel frame under structure consisting of completely welded U-shape weldments for extra strength and stability. Table frame is CARB Phase I & Phase II Compliant. Tables 72" and over will have steel stretcher bars installed within the table top for added stability. Steel glides are factory installed and included on all Parma tables - standard ENVIRONMENTAL: Greenguard Certified – Low Chemical Emissions FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede SIZE: Overall Dimension 24” d x 96” w x 30” h (custom height)	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-3
ITEM: Powered Reading Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Powered Reading Table MODEL: Matera Top #MAS-EKC-RB-ER-F06-WLB-870 Base #MAS-MPB-BS – (QTY – 2) Mediatrac3 grommet: #M3S-MMC-WLB-870 DESCRIPTION: TOP: Matera tops to have walnut veneer with a 1-1/4" reverse bevel edge. Top ships with structural rail system pre-installed. Mediatrac3 incorporates a veneer top and will have grommet lids that flush to the surround top. Mediatrac3 works in conjunction with the structural rail system. This rail system provides a mounting location for bases and auxiliary components for wire and equipment management. In addition, the rails also provide critical structural integrity to the conference table top allowing for longer spans with greater strength and dimensional stability. BASE: The Matera base features a removable inside panel that allows for access to wire management and preserves the narrow footprint. POWER/DATA: Mediatrac3 offers power options that utilize the electrical 4-Trac Power System, allowing for easy installation and reconfiguration capabilities. Double Door Mediatrac3 Power Grommet Modules are ganged together to create the specified assembly for the table. The double door modules have (6) grounded outlets powered by the 4-Trac system and the ability to accommodate (8) Extron AAP single plates specified separately. Power connection is corded to floor outlet.	   ENVIRONMENTAL: Greenguard and FSC C)12937 Certified – Low Chemical Emissions FINISHES: Top: Walnut Veneer - WLB – 870 Base: BS - Brushed Stainless Steel SIZE: 48" d x 96" w x 29-1/2" h

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-4
ITEM: Powered Reading Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Powered Reading Table MODEL: Matera Top #MAS-EOC-RB-ER-F10-WLB-870 Base #MAS-MPB-BS – (QTY – 2) Mediatrac3 grommet: #M3S-MME-WLB-870 DESCRIPTION: TOP: Matera tops to have walnut veneer with a 1-1/4" reverse bevel edge. Top ships with structural rail system pre-installed. Mediatrac3 incorporates a veneer top and will have grommet lids that flush to the surround top. Mediatrac3 works in conjunction with the structural rail system. This rail system provides a mounting location for bases and auxiliary components for wire and equipment management. In addition, the rails also provide critical structural integrity to the conference table top allowing for longer spans with greater strength and dimensional stability. BASE: The Matera base features a removable inside panel that allows for access to wire management and preserves the narrow footprint. POWER/DATA: Mediatrac3 offers power options that utilize the electrical 4-Trac Power System, allowing for easy installation and reconfiguration capabilities. Double Door Mediatrac3 Power Grommet Modules are ganged together to create the specified assembly for the table. The double door modules have (6) grounded outlets powered by the 4-Trac system and the ability to accommodate (8) Extron AAP single plates specified separately. Power connection is corded to floor outlet.	   ENVIRONMENTAL: Greenguard and FSC C)12937 Certified – Low Chemical Emissions FINISHES: Top: Walnut Veneer - WLB – 870 Base: BS - Brushed Stainless Steel SIZE: 48" d x 120" w x 29-1/2" h

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-5
ITEM: Browsing Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Custom Table	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Mobile Browsing Table MODEL: Custom DESCRIPTION: Design should include: Top to be 3cm thick Solid Surface (one piece) Tiered center display to be laminate Table base and legs to be constructed of 11-gauge, two inch square hot-rolled steel tube, laser cut for precision and welded. Casters to be heavy duty locking swivel. FINISH: Top: CaesarStone Quartz Surfaces #6141 Ocean Foam – polished finish Tiered Display: Plastic Laminate Formica #8829-58 graphite twill – matte finish Base: Matte clear coat over raw steel. SIZE: 42” d x 66” w x 30” h + tiered display	Conceptual Images 

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-6
ITEM: Meeting Room Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Meeting Room Table MODEL: Pisa Table #PSA4272-STH DESCRIPTION: Tabletop core is CARB Compliant 1.25" particle board. Laminate and phenolic backing are glued with water-based adhesives. The legs and apron are made with 2", 14-gauge square steel tubing. Apron mounts to top with 1/4-20 x 1” machine screws into metal inserts; no wood screws are used. Legs are attached to the apron with 3/8-16 bolts Standard glides are factory installed 1.25" industrial strength adjustable poly steel glides POWER / DATA: Oasis Mini A – Model #OAM-A-PC-S (qty 1) Finish: Silver Pearl Telcom Plate Option: (2) RJ45 Cat 6 data - #A-BL-B-B HDMI video - #A-BL-C45 WIRE MANAGEMENT: Snake – Model #SNAKE-BL (qty 1) Color: black SIZE: 42” d x 72” w x 30” h (STH – special table height)	 FINISHES: TABLE TOP FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede TABLE EDGE FINISH: Urethane Style: 6-G Flat Color: 004 folkstone TABLE LEG AND APRON FINISH: Color: Charcoal Textured

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-7
ITEM: Meeting Room Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Meeting Room Table MODEL: Pisa Table #PSA42S-STH DESCRIPTION: Tabletop core is CARB Compliant 1.25" particle board. Laminate and phenolic backing are glued with water-based adhesives. The legs and apron are made with 2", 14-gauge square steel tubing. Apron mounts to top with 1/4-20 x 1” machine screws into metal inserts; no wood screws are used. Legs are attached to the apron with 3/8-16 bolts Standard glides are factory installed 1.25" industrial strength adjustable poly steel glides FINISHES: TABLE TOP FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede TABLE EDGE FINISH: Urethane Style: 6-G Flat Color: 004 folkstone TABLE LEG AND APRON FINISH: Color: Charcoal Textured SIZE: 42” d x 42” w x 30” h (STH – special table height)	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-8
ITEM: Meeting Room Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Meeting Room Table MODEL: Pisa Table #PSA42120-STH (custom) DESCRIPTION: Tabletop core is CARB Compliant 1.25" particle board. Laminate and phenolic backing are glued with water-based adhesives. The legs and apron are made with 2", 14-gauge square steel tubing. Apron mounts to top with 1/4-20 x 1” machine screws into metal inserts; no wood screws are used. Legs are attached to the apron with 3/8-16 bolts Standard glides are factory installed 1.25" industrial strength adjustable poly steel glides POWER / DATA: Oasis Mini A – Model #OAM-A-PC-S (qty 2) Finish: Silver Pearl Telcom Plate Option: (2) RJ45 Cat 6 data - #A-BL-B-B HDMI video - #A-BL-C45 WIRE MANAGEMENT: Snake – Model #SNAKE-BL (qty 1) Color: black Wire Management Trough -Model #MMTO1 SIZE: Custom 42” d x 120” w x 30” h (STH – special table height)	 FINISHES: TABLE TOP FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede TABLE EDGE FINISH: Urethane Style: 6-G Flat Color: 004 folkstone TABLE LEG AND APRON FINISH: Color: Charcoal Textured

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-9
ITEM: Meeting Room Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Meeting Room Table MODEL: Pisa Table #PSA48144-STH DESCRIPTION: Tabletop core is CARB Compliant 1.25" particle board. Laminate and phenolic backing are glued with water-based adhesives. The legs and apron are made with 2", 14-gauge square steel tubing. Apron mounts to top with 1/4-20 x 1” machine screws into metal inserts; no wood screws are used. Legs are attached to the apron with 3/8-16 bolts Standard glides are factory installed 1.25" industrial strength adjustable poly steel glides POWER / DATA: Oasis Mini A – Model #OAM-A-PC-S (qty 2) Finish: Silver Pearl Telcom Plate Option: (2) RJ45 Cat 6 data - #A-BL-B-B HDMI video - #A-BL-C45 WIRE MANAGEMENT: Snake – Model #SNAKE-BL (qty 1) Color: black Wire Management Trough -Model #MMTO1 SIZE: 48” d x 144” w x 30” h (STH – special table height)	 FINISHES: TABLE TOP FINISH: Laminate Manufacturer: Pionite Pattern / Color: #AW300SD Love Letters Finish: Textured / Suede TABLE EDGE FINISH: Urethane Style: 6-G Flat Color: 004 folkstone TABLE LEG AND APRON FINISH: Color: Charcoal Textured

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-10
ITEM: Nesting Table	QUANTITY: reference quantities below
MANUFACTURER: Stylex or approved equal REP: Rick Gayeski Level Lines PHONE NUMBER: 630-258-4848 EMAIL: rgayeski@levellines.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Nesting Table MODEL: Adorn #ADB24MKT20MTMK – qty 1 Adorn #ADB125GRT30MTGR – qty 1 Adorn #ADB16TST14MTTS – qty 1 DESCRIPTION: Nesting tables. Tops - visible perimeter edge of each top is 3/8" above the base frame. Overall thickness of top is 3/8" steel tops. Steel tops have a simple but elegant rolled formed edge. Attachment of tops is done through a simple hardware connection. Bases are comprised of three steel rods, 3/8" in diameter, formed then welded together to create a unique framed appearance. Nylon glides – color to coordinate with frame color specified. ENVIRONMENTAL: GreenGuard Gold certified Conforms to ANSI/BIFMA Furniture Sustainability Standard – Level 1 FINISH: Metal top and Metal base: see above model numbers for color designation per table SIZE: 20" diam. X 24" h 30" diam. X 12.5" h 14" diam. X 16" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-11
ITEM: Maker Space Mobile Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Versteel or approved equal REP: Mary Vilotti Fine Lines PHONE NUMBER: 949.274.1099 EMAIL: mary@finelinesrep.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Maker Space Mobile Table MODEL: Maker Project Table # MKU3684REH29C DESCRIPTION: Top Construction: maple butcher block tops are 1 3⁄4" thick, constructed with kiln-dried, uniform-width staves face-glued in a continuous length pattern with square corners. Tops are shipped pre-drilled for field installation of bases and accessories. 6” Heavy duty locking swivel casters are available. Each maker table is constructed from 11-gauge, two inch square hot-rolled steel tube, laser cut for precision and hand welded for craft. FINISH: Top: Maple Butcher block - Clear Matte (MCL2) Metal legs: Clear matte SIZE: 36” d x 84” w x 29” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-12
ITEM: Children's Area Craft Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Knoll Studio or approved equal REP: Linda Kayne Robb Knoll PHONE NUMBER: 818.640.6059 EMAIL: Linda_Kayne-Robb@knoll.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Children's Area Craft Table MODEL: Risom Amoeba Table #643TAS DESCRIPTION: Top is ¾" thick Honey Beech laminate of 3-py construction with medium density fiberboard core and plastic laminate backer Legs and apron are select European Beech hardwood with a toned natural finish. Mortise and tenon construction. Lacquer finish. Environmental: Certified Clean Air GOLD. FINISH: Top: Honey laminate Wood legs: Natural Beech SIZE: 32" d x 42" w x 20" h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-13
ITEM: Teen Area Tall Computer Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Teen Area Tall Computer Table MODEL: Blueprint Loop #BPS-FOB-BC-SQ-ACS-A2B-A1B-Z02-WLT-870-WLT-870 DESCRIPTION: The loop base is constructed of solid walnut with subtle bevel details. The Block base provides a traditional panel look with concealed wire management and features a unique beveled edge detail on the inside. Blueprint power infeeds are routed through integral spacers to a multi-wire clip that offers advanced wire management. ENVIRONMENTAL: Greenguard Certified – Low Chemical Emissions for Building Materials, Finishes and Furnishings ELECTRICAL: Surface mount power solution allowing quick and easy daisy chaining. A maximum of (3) surface mount power modules can be connected on a single power infeed. The surface mount power module is available in one configuration with (2) grounded receptacles and (2) 2 amp USB ports. Each power module includes a separate power infeed with a 10’ grounded plug to connect to the power source. FINISH: Wood Veneer Top: Walnut #870 Wood legs: Walnut #870 SIZE: 42” d x 120” w x 42” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-14
ITEM: Community Room Multi-Purpose Table	QUANTITY: 30 tables (per library staff requirements)
MANUFACTURER: Bernhardt Design or approved equal REP: Lisa Ainsworth Covington Resources Group PHONE NUMBER: 714.803.7343 EMAIL: lainsworth@covingtoninc.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Community Room Multi-Purpose Table MODEL: Yuno Table #YNS-TT2-BK-WGL-682 Transportation Cart #ACS-TRY (qty 3) DESCRIPTION: Designed for use in flexible environments requiring reconfigurations and easy storage. Mobile stacking table for training with options for ganging and grouping in a flexible environment. Moving tables is a one-person operation. The glides on the foot of the table allow for easy alignment and arrangement of the tables, tilt the table back and let the glides do the work. When placed together the legs interlock and self-align the mating table. Nesting - To nest tables, align legs and gently push together until table tops match Glides on the base of the legs contain small casters that allow for easy alignment and arrangement of the tables. Bumpers are put in place to protect the legs when nesting together and to protect the tabletops when stacking. Transportation cart is designed for (1) person to easily load and move up to (10) tables. The cart is equipped with locking 4” casters and a tie down strap to secure the tables for movement. ENVIRONMENTAL: Greenguard Gold Low Chemical Emissions and FSC - C012937 certified	 FINISH: Top: Woodgrain Laminate #682 (Wilsonart #7949 - Asian Night) Metal base: Black powdercoat SIZE: 24” d x 67-3/8” w x 29-1/8” h

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-15
ITEM: Break Room Café Table	QUANTITY: Per FF&E Floor Plan, Sheet A131
MANUFACTURER: ERG International or approved equal REP: Kevin Rodenbeck Rodenbeck PHONE NUMBER: 858.922.2320 EMAIL: kevin@rodenbeck.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Break Room Café Table MODEL: Drake #DR30D DESCRIPTION: Tabletop core is CARB Compliant 1.25" particle board. Drake X-Base: 2.25" diameter 14-gauge steel tubing welded to top plate. Round Column Only. Diecast aluminum X-base. Assembly: Top plate is welded to the vertical column and the vertical column is bolted to the horizontal base. No tie rod assembly. Base mounts to tabletop with ¼-20 x 1" machine screws into metal inserts in top Adjustable poly glide with steel trim. TABLE TOP FINISH: Laminate Manufacturer: Formica Laminate Pattern / Color: #8829-58 Graphite Twill Finish: Matte TABLE EDGE – 3MM PVC Edge Style: 2-B Color: charcoal TABLE LEG FINISH: Color: Charcoal Textured SIZE: 30” diam. x 29” h	

PACIFIC HIGHLAND RANCH LIBRARY **FURNITURE SPECIFICATION**
ARCHITECTS hanna gabriel wells **Project No. 2016.27**

PROJECT NAME: Pacific Highland Ranch Library	ITEM CODE: T-16
ITEM: Workroom worktable	QUANTITY: per plan - reference sheet A131
MANUFACTURER: Hi5 Furniture or approved equal REP: Sheryl Gayeski Level Lines PHONE NUMBER: 630-258-4848 EMAIL: sgayeski@levellines.com	
DESCRIPTION:	PHOTO/SAMPLE:
ITEM: Workroom seated height worktable MODEL: Coby Square Table #CYST368429RES DESCRIPTION: Heavy duty construction for high use public spaces The Square Bases are offered with standoffs to give the tops a floating appearance. Edge: Self edges Square corners. Edge code: L6 1.25” thick laminate top. FINISH: Top: Formica Laminate #8829-58 Graphite Twill – Matte Finish Base: Powdercoat #GTM Graphite Metallic SIZE: 36” d x 84” w x 29” h	

END OF SECTION 12 56 50

SECTION 129300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seating.
2. Bicycle racks.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing pipe sleeves cast, and installing anchor bolts cast in concrete footings.
2. Section 312000 "Earth Moving" for excavation for installing concrete footings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

C. Samples for Initial Selection: For units with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish, not less than 6-inch- long linear components and 4-inch- square sheet components.

E. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For site furnishings manufactured with preservative-treated wood.

1. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For site furnishings to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 SEATING

A. Dm Braun & co.– 2' x 10' DMB cedar glue lam beam bench

B. Seat:

1. Material:
   a. Glue Laminated Cedar

2. Seat Height: 18”.
3. Seat Surface Shape: Contoured.
4. Overall Height: 18”.
5. Overall Length: 10’.

6. Weight: As Indicated.
7. Seating Configuration: Multiple units per plan.

2.2 BICYCLE RACKS

A. Forms and Surfaces

B. Bicycle Rack Construction:

1. Frame: Solid Cast Aluminum.

   a. Hardware and mounting plate: stainless steel.

2. Style: Double-side parking.

   a. Overall Height: 34”.
   b. Overall Width: 4”.
   c. Overall Depth: 5”.
   d. Capacity: Designed to accommodate no fewer than two bicycles.

3. Security: Designed to lock frame.
4. Installation Method: Surface mount with embedded anchors. Stainless steel anchors and tamper-resistant stainless steel screws are included.

C. Aluminum Finish: Gray Polyester powder coat.

1. Color: As indicated by manufacturer's designation.

2.3 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:

1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Structural Pipe and Tube: ASTM B 429/B 429M.
4. Sheet and Plate: ASTM B 209 (ASTM B 209M).
5. Castings: ASTM B 26/B 26M.

B. Steel and Iron: Free of surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53/A 53M, or electric-resistance-welded pipe complying with ASTM A 135/A 135M.
3. Tubing: Cold-formed steel tubing complying with ASTM A 500/A 500M.
4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513/A 513M, or steel tubing fabricated from steel complying with ASTM A 1011/A 1011M and complying with dimensional tolerances in ASTM A 500/A 500M; zinc coated internally and externally.
5. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
6. Perforated Metal: From steel sheet not less than 0.090-inch nominal thickness; manufacturer's standard perforation pattern.
7. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F 1267.
8. Malleable-Iron Castings: ASTM A 47/A 47M, grade as recommended by fabricator for type of use intended.
9. Gray-Iron Castings: ASTM A 48/A 48M, Class 200.

C. Stainless Steel: Free of surface blemishes and complying with the following:

1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312M.
3. Tubing: ASTM A 554.

D. Wood: Surfaced smooth on four sides with eased edges; kiln dried, free of knots, solid stock of species indicated.

1. Wood Species: Manufacturer's standard**.**

a. Douglas Fir: Clear Grade, vertical grain.
b. Western Red Cedar: Select Grade or better.
c. Ipe: Select Grade or better.

E. Fiberglass: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.

F. Plastic: Color impregnated, color and UV-light stabilized, and mold resistant.

1. Polyethylene: Fabricated from virgin plastic HDPE resin.

G. Anchors, Fasteners, Fittings, and Hardware: Stainless steel, Galvanized steel zinc-plated steel, , Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant, concealed, recessed, and capped or plugged.

1. Angle Anchors: For inconspicuously bolting legs of site furnishings to below-grade substrate; per manufacturer’s recommendation.
2. Antitheft Hold-Down Brackets: For securing site furnishings to substrate; extent as indicated on Drawings.

H. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M; recommended in writing by manufacturer, for exterior applications.

I. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.

J. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil (0.0076 mm) thick.
2. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

2.4 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment: Pressure-treat wood according to AWPA U1, Use Category UC3b, and the following:

1. Use preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
2. Kiln-dry lumber and plywood after treatment to a maximum moisture content, respectively, of 19 and 15 percent. Do not use materials that are warped or do not comply with requirements for untreated materials.

2.5 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended, so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.

E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

F. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.6 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.8 STEEL AND GALVANIZED-STEEL FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

2.9 IRON FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.10 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run directional finishes with long dimension of each piece.
2. Directional Satin Finish: No 4.
3. Dull Satin Finish: No. 6.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch (19 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 129300

SECTION 21 11 00

PRIVATE FIRE SERVICE MAIN

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Work includes, but is not necessarily limited to that shown on the approved plans and requirements of this section.

B. Private site fire water system shall include the following:

1. Connection of fire main system to laterals at property line as shown on approved plans.
2. Approved backflow prevention assembly or assemblies.
3. All on-site pipe, fittings, valves, hydrants and appurtenances as shown on the approved plans.
4. Location and configurations of fire department connections as approved by responding fire agency.
5. Building system service entry at each riser room.
6. All tests, flushing, inspections and sanitation treatments as required to obtain approval by all authorities having jurisdiction including local fire authority, serving water department and DSA Inspector of Record.
7. Fees, permits, inspections and tests.
8. Meetings and correspondence with project team members and authorities having jurisdiction to confirm specific requirements for this project, including:
   a. Locations and methods of discharging water from tests and flushing.
   b. Requirements for pipe and fitting exposure to facilitate visual inspections.

C. Refer to Section 21 13 13 "Wet-Pipe Fire Sprinkler System" for interior building systems work that is not a part of this section.

1.2 RELATED SECTIONS

A.	General Requirements	Division 01
B.	Wet-Pipe Fire Sprinkler Systems	Section 21 13 13
C.	Common Work Results, Plumbing	Division 22
D.	Fire Alarm	Section 27 30 00
E.	Water Utilities	Section 33 10 00

1.3 QUALITY ASSURANCE

A. Prior to acceptance of the work on private property, obtain/verify acceptance of all work in the public domain from the serving utility and submit copies of the Certificates of Completion to the

inspector and owner.

1.4 CODES AND STANDARDS

A. Comply with all requirements of:

1. California Building Code, 2016 edition.
2. California Fire Code, 2016 edition.
3. State of California, Division of the State Architect.
4. City of San Diego Fire Department requirements.
5. City of San Diego Water Utilities Department requirements.
6. NFPA 13, 24, 25 and 72 (as adopted by the State of California).
7. Underwriters Laboratories (UL) and FM Global (FM) listed products.
8. American Water Works Association (AWWA) requirements and specifications.

B. Other Referenced Standards:

Unless otherwise noted on the plans, all work shall conform to the following standard specifications and drawings:

1. Standard Specifications:
   a. Standard Specifications for Public Works Construction, current Edition.
   b. City of San Diego Design Guidelines and Standards, current edition.
   c. California Dept. of Transportation, "Manual of Traffic Controls for Construction and Maintenance Work Zones", California MUTCD, 2012 ed.
   d. City of San Diego Cross-Connection Control and Backflow Prevention Programs.
2. Standard Drawings:
   a. City of San Diego Standard Drawings For Public Works Construction.
   b. San Diego Regional Standard Drawings (S.D.R.S.) as Recommended by the Regional Standards Committee, Maintained and Published by the San Diego County Department of Public Works, 2012 edition.

1.5 SUBMITTALS

A. Submit materials data sheets for all proposed product substitutions from the approved plans and data sheets. A statement of equivalency shall accompany items that are not exactly comparable to the approved product. Proposed substitutions of backflow assemblies shall only be allowed if submitted to and approved by City of San Diego Fire Life Safety review with all required hydraulic calculations for any additional pressure loss. Such substitutions shall be at the contractor’s risk and at no additional expense to the owner.

B. Record Drawings: At project closeout, submit record drawings of installed fire water system piping and products, in accordance with requirements of Division 1.

C. Maintenance Data: Submit maintenance data and parts lists for fire water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 01

1.6 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by District or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner or Construction Manager no fewer than five days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Owner or Construction Manager's written permission.

PART 2 – PRODUCTS

2.1 IDENTIFICATION

A. Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 3" wide x 4 mils thick. Provide tape with printing reading "CAUTION BURIED WATER LINE BELOW" (or similar language).

2.2 PIPE AND PIPE FITTINGS – GENERAL

A. Provide ells, tees, reducing tees, couplings, and other required piping accessories of same type and class of material as conduit, or of material having equal or superior physical and chemical properties as acceptable to Owner’s Architect/Engineer and Inspector.

B. Joints for pipe shall be push-on joints as specified in ASTM D 3139. Joints between pipe and metal fittings, valves, and other accessories shall be push-on joints as specified in ASTM D 3139, or shall be compression-type joints/mechanical-joints as respectively specified in ASTM D 3139 and AWWA C111. Each joint connection shall be provided with an elastomeric gasket suitable for the bell or coupling with which it is to be used.

1. Gaskets for push-on joints and compression-type joints/mechanical-joints for joint connections between pipes and metal fittings, valves, and other accessories shall be as specified in AWWA C111 respectively for push-on joints and mechanical-joints.
2. Mechanically coupled joints, using a sleeve-type mechanical coupling, may be used as an optional jointing method in lieu of push-on joints on plain-end PVC plastic pipe.

2.3 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

B. Hard Copper Tube: ASTM B 88, Type K or Type L, water tube, drawn temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if

required to match piping.

D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.4 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Gaskets: AWWA C111, rubber.

C. Flanges: ASME 16.1, Class 125, cast iron.

2.5 PVC PIPE AND FITTINGS

A. PVC, AWWA Pipe: AWWA C900 bell end with gasket and with spigot end, Pressure Class 150/235 (DR 18) with cast- iron-pipe-equivalent OD. Where pressures may exceed 175 PSI, pipe shall be Pressure Class 200/305 (DR 14).

1. Comply with UL 1285 for fire-service mains as applicable and/or required.
2. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   a. Gaskets: AWWA C111, rubber.
3. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   a. Gaskets: AWWA C111, rubber.

2.6 POLYETHYLENE PIPE AND FITTINGS

A. PE, ASTM Pipe: ASTM D 2239, SIDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 160 psig.

1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 200 psig.

1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 200 psig.

C. PE, Fire-Service Pipe: ASTM F 714, AWWA C906, or equivalent for PE water pipe; FMG approved, with minimum thickness equivalent to FMG Class 200.

1. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

2.7 CHLORINATED POLYVINYL CHLORIDE FIRE PROTECTION PIPE AND FITTINGS

A. CPVC, listed for fire protection per UL 1821.

1. LISTED FOR FIRE PROTECTION SERVICE

2.8 TRANSITION FITTINGS

A. One-piece riser sweep, 90° fabricated 304 stainless steel.

1. UL and/or FM approved for fire protection services.
2. Working pressure rating 200 PSI minimum, equivalent to DR 14.
3. Vertical end per AWWA C606 for roll groove and C-207 for flanged pipe.
4. Horizontal end per AWWA C900 and standard ductile iron pipe diameters with UL 157 gasket.

2.9 GATE VALVES

A. Provide flanged or mechanical joint gate valves, listed for fire protection service, 175 psi working pressure for 12" and smaller, 150 psi for sizes larger than 12".

1. Non-rising-Stem, Resilient-Seated Gate Valves
   a. Description: Ductile-iron body and bonnet; with bronze gate, resilient seats, bronze stem, and stem nut.
   b. Standard: AWWA C509. Minimum Pressure Rating: 250 psig.
   c. End Connections: Push on or mechanical joint.
   d. Interior Coating: Complying with AWWA C550.

2. OS&Y, Rising-Stem Gate Valves
   a. Description: Ductile-iron body and bonnet, with bronze gate, resilient seats, and bronze stem.
   b. UL 262, FM approved. Minimum Pressure Rating: 175 psig.
   c. End Connections: Flanged.

B. Indicator Posts: UL 789, FM approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve. Post shall be listed for use with specific make/model of gate valve.

C. Valve Box and Cap: Telescopic barrel type for use with underground gate valves, cap is to be cast iron and marked "WATER".

2.10 BACKFLOW PREVENTION ASSEMBLY

A. Backflow preventer assembly shall be installed strictly per all requirements and standard drawings of serving water authority. Assembly shall be Reduced Pressure Detector Assembly (RPDA) with bypass and meter as required.

B. Any proposed assembly shall be U.L. classified and/or FM approved for fire protection service and shall be listed by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.) Verify exact make and model of appliance with serving water authority.

2.11 CHECK VALVES

A. Check valves shall be iron body, bronze mounted, horizontal swing check. As acceptable to authorities having jurisdiction, iron body, bronze, disk wafer check may be used.

B. Check valve shall be U.L/F.M. approved for fire protection use, and recommended by the manufacturer for direct bury where such installation is to be required.

1. Where check valve is installed underground, an approved valve box or other means of accessing the valve for inspections and testing shall be furnished and installed.

C. Iron body, bronze disk threaded or grooved swing check may be installed at Fire Department Connection, and located as acceptable to serving fire department.

2.12 FIRE HYDRANTS

A. General: Hydrants shall conform to serving fire department requirements. Number of hydrants, spacing and proximity to fire apparatus lanes shall be in accordance with approved plans.

B. Hydrants shall be wet-barrel type except where subject to freezing.

C. Hydrants shall be furnished with National Standard (fire hose) Threads (NST). Unless noted otherwise there shall be two 4” and one 2½” ports, individually valved and equipped with caps and chains.

2.13 FIRE DEPARTMENT CONNECTIONS

A. Furnish 4" x 2 1/2" two-way, Siamese fire department connection. Finish and model shall be in conformance with serving fire department requirements. Provide check valve per Section 2.11.

B. Fire department connection piping shall be ductile iron, with corrosion protection as specified in this section. No steel piping shall be installed at fire department connections.

2.14 ANCHORAGES

A. General: Provide anchorages for ells, tees, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.

1. Clamps, Straps and Washers: Steel, ASTM A 506.
2. Rods: Steel, ASTM A 575.
3. Rod Couplings: Malleable-iron, ASTM A 197.
4. Bolts: Steel, ASTM A 307.
5. Cast-Iron Washers: Gray-iron, ASTM A 126.
6. Thrust Blocks: Concrete, minimum 2,500 psi.

2.15 CORROSION PROTECTION

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Sheet or tube.
3. Material: LLDPE film of 0.008-inch minimum thickness.
4. Material: LLDPE film of 0.008-inch minimum thickness, or high-density, cross-laminated PE film of 0.004-inch minimum thickness.
5. Material: High-density, cross-laminated PE film of 0.004-inch minimum thickness.
6. Color: Black.

B. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined
2. Dielectric Unions:
    a. Standard: ASSE 1079.
    b. Pressure Rating: 250 psig.
    c. End Connections: Solder-joint copper alloy and threaded ferrous.
3. Dielectric Flanges:
    a. Standard: ASSE 1079.
    b. Factory-fabricated, bolted, companion-flange assembly.
    c. Pressure Rating: 150 psig or 300 psig.
    d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
4. Dielectric-Flange Insulating Kits:
    a. Field-assembled companion-flange assembly, full face or ring type.
    b. Non-conducting materials for field assembly of companion flanges.
    c. Pressure Rating: 150 psig or 300 psig.
    d. Gasket: Neoprene or phenolic.
    e. Bolt Sleeves: Phenolic or polyethylene.
    f. Washers: Phenolic with steel backing washers.
5. Dielectric Couplings:
    a. Galvanized steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends.
    b. Pressure Rating: 300 psig.
6. Dielectric Nipples:
    a. Standard: IAPMO PS 66.
    b. Electroplated steel nipple complying with ASTM F 1545.
    c. Pressure Rating: 300 psig at 225 deg F minimum.
    d. End Connections: Male threaded or grooved.

e. Lining: Inert and noncorrosive, propylene.

2.16 ELECTRONIC SUPERVISION

A. Furnish valve supervision, as required by authorities having jurisdiction, at all valves controlling fire protection water supplies, and any required underground conduit thereto.

B. Provide UL/FM approved tamper switch, Model PIVSU-A1, or OSYSU-A1, or UL/FM listed equivalent, 12 or 24 VDC or 120VAC with one set of Form C, single pole, double-throw contacts.

C. Tamper connections shall be furnished and zoned as required by serving fire department.

D. Signals shall be monitored at local fire alarm panel and central station as required and as shown on fire alarm plans.

PART 3 – EXECUTION

3.1 INSTALLATION OF IDENTIFICATION

A. General: During back-filling/top-soiling of underground fire water piping systems, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished subgrade, but at least 6" above the top of pipe.

3.2 INSTALLATION OF PIPE AND PIPE FITTINGS

A. General: Install exterior fire water systems in compliance with applicable provisions of NFPA 24 and the Standard Specifications for Public Works Construction.

B. Polyvinyl Chloride Pipe: Install in accordance with manufacturer's installation instructions.

C. Depth of Cover: Provide three (3) foot minimum depth of cover over underground piping.

D. Transition from underground to interior building system the passes under footings and on-grade slab shall utilize a one-piece riser sweep.

1. Pipe and fittings shall be installed so that no mechanical joints are located below structural footing or slab on grade.
2. All penetrations of floors and walls shall maintain minimum 2” annular clearance around entire circumference of piping.
3. All piping shall be restrained using mechanical joint fittings, rods and/or thrust blocks.
4. All pipe and fittings shall be protected from corrosion as specified in this section.

3.3 INSTALLATION OF VALVES

A. General: Install valves as indicated. Provide post indicator for control valves where shown on plans.

B. Control Valves: Install post indicator valve at each connection into building, locate 40' from building outside wall, or as shown on approved plans.

C. Shutoff Valves: Install shutoff valve ahead of each hydrant.

3.4 CONCRETE PADS

A. As required by serving fire and/or water department, furnish concrete pads under all fire hydrants, backflow prevention assemblies and fire service valve assemblies per standard drawings and details.

1. Where pipe, fittings and devices are installed in the horizontal position, furnish approved pipe stands or other means of support.

3.5 SIGNAGE

A. Provide signage as required by serving fire department to identify all fire protection system valves and fire department inlet connections. Signs shall be building and system specific and shall be constructed of durable, weather-resistant materials and shall be finished or coated or otherwise protected as required to prevent damage and fading from ultra-violet light.

1. As required by serving fire authority, signage shall be affixed to valves and inlet connections using lightweight chain with zinc or galvanized finish.
2. Lettering shall be of the minimum size and color required by serving fire department.
3. Where required, signage shall be installed on posts and elevated above finished grade.

3.6 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline with water 24-hrs prior to testing, and apply test pressure to stabilize system.

B. Hydrostatic Tests: Test at not less than 200 psi for 2 hours, or at 50 psi above maximum static pressure where greater than 150 psi.

1. Test shall be considered a fail if leakage exceeds allowable as prescribed in NFPA 24, or as required by authorities having jurisdiction.
2. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

C. Upon acceptance of hydrostatic testing by DSA Inspector of Record, the entire fire main system shall be flushed in accordance with the procedures described in NFPA 24. Flow rates shall be as required by NFPA 24, or at the hydraulically calculated water demand rate of the system, whichever is greater.

1. Erosion and storm drain controls, conformance to local best practices and the collection/treatment of discharge as required shall be the responsibility of this contractor.

D. Operating Tests: Open and close all valves and hydrants under system water pressure. Order required operational tests by serving Fire and Water Departments.

3.7 COMPLETION

A. Closeout

1. Upon completion and approval of system, and prior to occupancy, provide instruction to the Owner, or Owner's representative, in all details of system operation and maintenance. Prepare and submit maintenance and operation manual per other sections of specifications as applicable.
2. Provide three copies of final inspection and certification as prescribed by Owner's Insurance Underwriter, and other authorities having jurisdiction.
3. Furnish fully executed NFPA Materials and Test Certificate to Owner or Owner's representative, local fire authority, architect and to DSA Inspector of Record.
4. Submit two copies of guarantee per Division 01.
5. Provide three (3) copies of system "As-Built" drawings to the Owner or Owner's representative. Drawings shall show actual installation details including all piping and equipment locations, room or facilities modifications, etc. One (1) copy of drawings shall be on reproducible type media.

B. Clean Up

1. Equipment, appurtenances, fixtures and exposed piping shall be clean, and all excess dope and oil shall be removed. Sprinkler heads shall be cleaned without the use of any solvents.
2. Upon completion of work, remove all surplus material, debris, and equipment associated with or used in the execution of this work. Sweep work and storage areas, as required, to remove metal shavings and oily residue.

END OF SECTION

SECTION 21 13 13

WET-PIPE FIRE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work includes, but is not necessarily limited to, the following work areas:

1. Installation of a complete wet-pipe automatic fire sprinkler systems in all areas shown on plans including all interior compartments, exterior soffits (where required) and combustible concealed spaces if any.
2. Compilation of record drawings by installing contractor, including all field changes and installing contractor's C-16 license number.
3. Connection of interior fire sprinkler systems to site fire service laterals, at points of connection shown on fire protection and civil site plans.
4. Test valves, drain lines, and all other inspection components.
5. All coring, drilling, sleeving and chasing required for piping installation, as approved by Architect and Structural.
6. Local audible alarm and connection points for central station monitoring, as shown on plans and as specified.
7. Fees, permits, inspections and tests.
8. Meetings and correspondence with project team members to confirm specific requirements for this project, including:
   a. Location and methods of discharging water from test and drain connections.
   b. Zoning and signaling requirements for alarm, detection and monitoring systems.

1.2 RELATED WORK IN OTHER SECTIONS

A.	General Requirements	Division 01
B.	Painting	Section 09 90 00
C.	Private Fire Service Main	Section 21 11 00
D.	Plumbing	Division 22
E.	Fire Alarm	Section 27 30 00
F.	Water Utilities	Section 33 10 00

1.3 QUALITY ASSURANCE

A. Qualifications of Fabricators and Installers
   1. Installing contractor shall have a California C-16 license.

1.4 REFERENCES

A. In addition to complying with all pertinent standards, codes and regulations, comply with all requirements of:

1. California Building Code, 2016 edition.
2. California Fire Code, 2016 edition.
3. San Diego Development Services Department requirements.
4. San Diego Fire Department requirements.
5. San Diego Water Utilities Department requirements.
6. NFPA 13, 24, 25 and 72 (as adopted by the State of California).
7. Underwriters Laboratories (UL) and FM Global (FM) listed products.
8. ICC Evaluation Service listed products.

1.5 SUBMITTALS

A. Shop Drawings

1. Within 30 days after award of Contract, submit shop drawings to the Architect for review. A complete submittal shall include the following:
   a. Shop drawings shall be in compliance with approved plans.
   b. Location of all switches, bells and electrical connections for alarm system, as described in this specification.
   c. Location of connections to drain receptors for test and drain discharge.
   d. Where revisions are proposed due to coordination with work of other trades, they shall be clearly illustrated and called out for review.
   e. Where value-engineered revisions are proposed, they shall be clearly illustrated and called out for review.
   f. Notations and identifying marks for fabrication may be included.

2. Submit materials data sheets for all proposed product substitutions from the approved plans and data sheets. A statement of equivalency shall accompany items that are not exactly comparable to the approved product. Proposed substitutions of hanger and bracing materials shall only be allowed if submitted to and approved by City of San Diego Fire Life Safety and Structural review with all required calculations and written acceptance by project structural engineer. Such substitutions shall be at the contractor’s risk and at no additional expense to the owner.

B. Maintenance Manual

1. At close-out, submit maintenance manual describing maintenance schedules, replacement parts, and operational requirements.

C. Guarantee

1. Contractor shall guarantee fixed fire protection system, for a period of two years after date of final inspection, from leaks and other failures from materials and workmanship. Guarantee shall include repair of damage to Owner.

1.6 COORDINATION

A. Coordinate work with that specified in other sections before start of installation. Any installation found to be in conflict with other trades due to neglected coordination, shall be removed and reinstalled as directed by the Architect at no additional expense to the Owner.

B. Contractor shall contact the Architect and obtain necessary information to design fire sprinkler system to fit into allotted spaces without interfering with work by other trades.

C. Coordinate with Plumbing section for size and location of drain receptors, where required or shown for draining and testing fire sprinkler risers and systems. All drain piping shall discharge into the receptors and not through walls or curbs, unless noted otherwise.

PART 2 - DESIGN AND MATERIALS

2.1 GENERAL DESIGN CRITERIA

A. Coverage and Scope

1. General storage, book racks, utility and service areas shall be protected for Ordinary Hazard. Sprinklers shall be spaced at a maximum coverage of 130 sq. ft. for standard spray sprinklers.
2. All other areas shall be protected for Light Hazard. Sprinklers shall be spaced at a maximum coverage of 225 sq. ft. for standard spray sprinklers or as shown on plans for sidewall or extended coverage sprinklers.

B. System shall be designed using point of connection as shown on drawings, and as described in this specification.

2.2 MATERIALS AND PRODUCTS - GENERAL

A. All material installed shall be approved and/or listed for fire protection use by the referenced authorities, codes and standards. All material shall be new and without field modifications.

2.3 SPRINKLERS

A. General

1. All sprinklers shall be of similar make and appearance and shall have the same bulb or link and finish except where otherwise required by exposure to heat sources, freezing temperatures, corrosive environment, etc.

B. Interior Finished Ceilings and Exterior Soffits

1. Provide recessed standard spray pendent, with white polyester finish and matching escutcheon.
2. Listed corrosion-resistant sprinklers shall be installed at exterior areas, with white polyester or Teflon finish and matching escutcheon.

C. Concealed Areas, Unfinished Ceilings, and Service Areas

1. Provide standard spray upright or pendent, with white finish.
2. Where required, escutcheons shall be two-piece, style #401 with white painted finish at areas with ceilings.

D. Temperature Ratings and Response Type

1. Sprinklers below finished ceilings, and in all other occupied areas shall have a temperature rating of Ordinary (155-165° F), except as noted below.
   a. Sprinklers in unventilated spaces and under exterior canopies shall have a temperature rating of Intermediate (200-212° F).
   b. Sprinklers in zone of influence of space heaters or other heat-producing equipment shall have a temperature rating of High (250-300° F), unless otherwise required by code.
   c. All sprinklers shall be listed, quick-response type.

2.4 HANGERS AND SUPPORTS

A. General

1. Provide hangers approved by UL/FM and NFPA 13 for fire sprinkler systems. Shop fabricated supports shall be designed to meet requirements of NFPA 13, and must be certified by a registered professional engineer.
2. Provide earthquake bracing in accordance with UL/FM, NFPA 13 and ASCE 7. Locations of all bracing shall be shown on shop drawings in conformance with approved plans. All bracing shall be assembled and installed per NFPA 13 and manufacturer's installation instructions.
3. Size all anchors and fasteners per NFPA 13. All lag screws, bolts and drive screws shall be installed as required by codes and accepted good practices.
4. All fasteners and/or anchors proposed for use in concrete construction shall be specifically listed and approved for use on fire sprinkler systems in seismic zones. Powder-driven studs shall not be used unless all system components including installation tool and pins are listed.

2.5 INTERIOR SPRINKLER PIPE AND FITTINGS

A. General

1. All pipe and fittings shall be new, acceptable to authorities having jurisdiction, per all applicable standards and codes, and free from damage and distortion.

B. Product Characteristics

1. Black steel, Schedule 40, ASTM A-53/135/795, for all piping, with threaded joints and fittings.
2. Black steel, Schedule 10, ASTM A-53/135/795, for all piping, with non-threaded joints and fittings.
3. Threaded fittings shall be of cast or malleable iron, class 125 or 150, conforming to ANSI B16.3 and ANSI B16.4.

4. Flanged fittings shall be provided where required. Flanges shall be of cast iron, class 125, conforming to ANSI B16.1.
5. Welded fittings shall be of wrought steel, conforming to ANSI B16.9.
6. One-piece reducing fittings shall be used wherever a change is made in pipe size. Bushings shall not be used, except where fittings of the required size are not available.
7. Grooved thinwall steel pipe connections shall be made using a UL/FM approved ductile iron coupling, with rubber gasket. Installation shall be per manufacturer's instructions.
8. All piping shall be joined with welded, threaded or grooved fittings. Fittings for hole-cut connections are not acceptable.

2.6 ACCESSORY CABINET

A. Furnish metal sprinkler cabinet in riser room, with reserve supply of sprinklers as required by NFPA 13. Include one suitable head wrench for each type of sprinkler installed. Stock shall include all types and temperature ratings.

2.7 SIGNS

A. Provide metal signage permanently marked to show function, for all valves, controls and related assemblies. Locate as required by NFPA 13 and authorities having jurisdiction. Where signs are required to identify valves or assemblies in hidden or void spaces, locate as directed by Architect.

2.8 PROTECTION OF SPRINKLERS

A. Provide UL/FM listed guards for sprinkler heads located in areas susceptible to mechanical damage.

2.9 ESCUTCHEON PLATES

A. Provide chrome-plated escutcheons where exposed piping penetrations are made through finished walls and ceilings. Plates shall be painted to resist corrosion when exterior installation is required.

2.10 LOCAL ALARM COMPONENTS

A. Exterior Alarm Bell

1. Furnish 10" diameter, UL/FM approved bell with identification sign, rated 120VAC, with standard mounting hardware.
2. Locate as shown on approved plans.

B. Water Flow Switch

1. Provide UL/FM approved, 120VAC with two sets of Form C, single pole, double throw contacts, and adjustable retard feature.
2. Retard shall be set by Contractor so as to prevent false alarms, and still allow audible alarm within 30 seconds.

2.11 CENTRAL STATION SUPERVISION

A. General

1. Furnish supervision at all valves controlling fire protection water supplies, and any required underground conduit thereto.
2. Provide UL/FM approved tamper switch, Model PCVS-1, or OSYSU-1, or UL/FM listed equivalent, 120VAC with one set of Form C, single-pole, double-throw contacts.

2.12 FIRE DEPARTMENT CONNECTION

A. Provide 4 " x 2 ½", single or double clapper 2-way fire department connection. Finish and model shall be as required by serving fire department. Provide check valve per Section 2.14B.

2.13 VALVE COMPONENTS

A. Control Valve

1. Main system control valve shall be located on the backflow assembly.

B. Backflow Prevention and Check Valves

1. Check valves shall be iron body, bronze mounted, horizontal swing check. As acceptable to authorities having jurisdiction, iron body, bronze, disk wafer check may be used.
2. Check valve shall be U.L/FM approved for fire protection use, and recommended by the manufacturer for direct bury where such installation is to be required.
3. Iron body, bronze disk threaded or grooved swing check may be installed at Fire Department Connection, and located as acceptable to serving fire department.

C. Interior Drain/Test Valves

1. Furnish listed combination test and drain valve at riser, as shown on the approved plans. Provide pressure relief type, with bypass.
2. Where auxiliary drainage is required, provide brass, rubber disc, angle or globe pattern, with screwed ends, rated 200psi WOG.

2.14 VALVE CHART

A. Provide chart in enclosed frame, indicating all valve locations functions.

2.15 UNDERGROUND PIPE AND FITTINGS

A. General

1. All pipe and fittings shall be new, acceptable to authorities having jurisdiction, comply with all applicable standards and codes, and free from damage and distortion.

B. Product Characteristics

1. Pipe shall be cast or ductile iron, or C-900 PVC, as shown on plans or required by water department. Pipe under structural footings shall be a one-piece, stainless steel sweep.
2. Fittings shall be ductile iron, class 250, flanged or mechanical joints as required. Proper thrust restraint shall be provided per NFPA 24.
3. All hardware installed below-grade, including studs, bolts, nuts, washers, thrust-restraint rods, etc. shall be stainless steel conforming to UNS 31600 (formerly AISI Type 316). Hex-head bolts shall conform to ASTM F593, Alloy Group 2, Condition CW1/CW2 (depending on size). Hex nuts shall conform to ASTM F594, Alloy Group 2, Condition CW1/CW2 (depending on size). T-bolts shall be stamped to show conformance with UNS 31600.

PART 3 - EXECUTION

3.1 JOB SITE CONDITIONS

A. Inspection

1. Prior to all work of this section carefully inspect the installed work of other sections, and verify that all such work is complete to the point where this portion of the work may properly commence in accordance with all submittals, designs, and applicable codes.

B. Discrepancies

1. In the event of a discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies and/or omissions have been fully reviewed and clarified.

3.2 FABRICATION

A. General

1. All pipe, fittings, and materials shall be prepared by qualified personnel, trained and experienced with the products involved, and the recommended methods of preparation.
2. All pipe cuts, threads, and grooves shall be made according to applicable codes, standards and accepted good practices.
3. Pipe shall be free of damage, flaws and burrs. Threads and grooves shall not be excessively shallow or deep.
4. Fittings shall be made onto the pipe no tighter than necessary. Cracked or broken fittings shall be replaced, without exception.
5. Excess dope and oils shall be removed before shipment to job site.

B. Welding

1. Welding methods shall comply with NFPA 13 and AWS B2.1. Contractor shall be responsible for all welded joints and any qualifying procedures for welders.

2. Holes in pipe for outlets shall be cut to full inside diameter of fitting, prior to welding in place. Holes shall be free of slag and welding residue and of smooth bore. Fittings shall not penetrate internal diameter of run piping. Holes shall be cut by hole-saw or other rotary bit. Torch-cutting of holes is prohibited.

3.3 INSTALLATION

A. General

1. All installations shall be per referenced standards. Follow manufacturer's directions and recommendations in all cases as required for all approvals and warranty enforcement.
2. All cutting of structure shall be subject to approval by the Architect. Beams, decks and other structural components shall not be cut or altered in any way unless previously approved.
3. Provide flexible couplings where required to provide expansion capability, and for earthquake protection per NFPA 13. Provide sway bracing as required by coupling locations.
4. Entire sprinkler system shall be installed in such a manner so that it can be drained in accordance with NFPA 13. Drains shall be located at suitable points as approved by Architect. No primary or auxiliary drain shall be located in any public area or electrical room. All drains shall discharge into dedicated receptors.
5. No work shall be covered or enclosed until inspected, tested, and approved by Architect and/or authority having jurisdiction. Should any work be concealed before inspection, the Contractor shall, at Contractor's expense, uncover such work and after it has been inspected, tested and approved, provide for all repairs as may be necessary to restore work to original and proper condition.
6. Sprinklers at finished ceilings and in exposed locations shall form a symmetrical pattern and shall be located at the exact centerline of 2’ square ceiling tiles and “Second Look” tile modules. Where 2’ x 4’ ceilings occur, sprinklers shall be centered in the 2’ direction with escutcheons at least 6” clear of ceiling T-bars.
7. Sprinkler layout shall accommodate lighting and HVAC register locations. Coordination with the work of these sections is the responsibility of Contractor.
8. Without exception, no piping shall be run under or through any skylight or skylight well. Any additional upright or pendent sprinklers, which may be required by skylight locations, shall be the responsibility of this contractor.
9. All penetrations of wall and floor assemblies shall be suitably sleeved, patched and/or sealed in order to preserve fire rating, where applicable.
10. Location of control valves, fire department connection, and inspector's test shall be as required by authorities having jurisdiction, and as approved by Architect.
11. Local alarm bells shall be located so as to be easily heard and seen by passersby and fire department personnel. Locate on exterior wall, 10’-0” – 12’-0” above finished grade.
12. Provide wood or metal floor pans under and around pipe cutting/threading machines to protect floor surfaces from damage and discoloration.
13. Paint all fire sprinkler piping risers, drops and other components exposed to view in final construction as directed by Architect and per Section 09 91 23.

14. Underground pipe and fittings shall be installed per NFPA 24, and applicable local codes and standards. Trenching, back-filling, depth of bury and size, shape and location of all thrust blocks shall be acceptable to all jurisdictional agencies.

3.4 FIELD QUALITY CONTROL

A. Testing

1. Perform all tests as required by NFPA 13, and all authorities having jurisdiction. Maintain an accurate record of all tests and inspections on the job site, including date of test and inspecting agency.
2. Before connection of interior system to underground main, underground piping shall be hydrostatically tested, flushed and accepted by authorities having jurisdiction. Provide documentation of acceptance by jurisdictional authority. All required health and bacterial tests shall be the responsibility of Contractor.

3.5 COMPLETION

A. Closeout

1. Upon completion and approval of system, and prior to occupancy, provide instruction to the Owner, or Owner's representative, in all details of system operation and maintenance. Prepare and submit maintenance and operation manual per other sections of specifications as applicable.
2. Provide three copies of final inspection and certification as prescribed by Owner's Insurance Underwriter, and other authorities having jurisdiction.
3. Provide three (3) copies of system "As-Built" drawings to the Owner or Owner’s representative. Drawings shall show actual installation details including all piping and equipment locations, room or facilities modifications, etc. One (1) copy of drawings shall be on reproducible type media.
4. Furnish fully executed NFPA Materials and Test Certificate.
5. Submit two copies of guarantee per Section 017000.

B. Clean Up

1. Equipment, appurtenances, fixtures and exposed piping shall be clean, and all excess dope and oil shall be removed. Sprinkler heads shall be cleaned without the use of any solvents.
2. Upon completion of work, remove all surplus material, debris, and equipment associated with or used in the execution of this work. Sweep work and storage areas, as required, to remove metal shavings and oily residue.

END OF SECTION 21 13 13

SECTION 22 05 13

COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet (1000 m) above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F.

J. Code Letter Designation:

1. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.

K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 ADDITIONAL REQUIREMENTS FOR POLYPHASE MOTORS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width-modulated inverters.
2. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
3. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220513

SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

2.2 STACK-SLEEVE FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Smith, Jay R. Mfg. Co.
2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

3. Or approved equal.

B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metraflex Company (The).
2. Or approved equal.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Presealed Systems.
2. Or approved equal.

B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07920 "Joint Sealants."

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07841 "Through-Penetration Firestopping Stop Systems."

3.2 STACK-SLEEVE-FITTING INSTALLATION

A. Install stack-sleeve fittings in new slabs as slabs are constructed.

1. Install fittings that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 07620 "Sheet Metal Flashing and Trim."
3. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level.

4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
5. Using grout, seal the space around outside of stack-sleeve fittings.

B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07841 "Through-Penetration Firestopping Stop Systems."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

    a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves.

2. Exterior Concrete Walls below Grade:

    a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.

        1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:

    a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.

1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

4. Concrete Slabs above Grade:

   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.

5. Interior Partitions:

   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.

END OF SECTION 220517

SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Escutcheons.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.

e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished, chrome-plated finish.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 220518

SECTION 22 05 19

METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bimetallic-actuated thermometers.
2. Liquid-in-glass thermometers.
3. Thermowells.
4. Dial-type pressure gages.
5. Test plugs.

B. Related Sections:

1. Division 331000 Section "Water Utilities" for domestic water meters outside the building.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of meter and gage, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 BIMETALLIC-ACTUATED THERMOMETERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Trerice, H. O. Co.
2. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
3. Weiss Instruments, Inc.

B. Standard: ASME B40.200.

C. Case: Liquid-filled and sealed type(s); stainless steel with 3-inch (76-mm) nominal diameter.

D. Dial: Nonreflective aluminum with permanently etched scale markings and scales in deg F (deg C).

E. Connector Type(s): Union joint, rigid, back and rigid, bottom, with unified-inch screw threads.

F. Connector Size: 1/2 inch (13 mm), with ASME B1.1 screw threads.

G. Stem: 0.25 or 0.375 inch (6.4 or 9.4 mm) in diameter; stainless steel.

H. Window: Plain glass.

I. Ring: Stainless steel.

J. Element: Bimetal coil.

K. Pointer: Dark-colored metal.

L. Accuracy: Plus or minus 1 percent of scale range.

2.2 LIQUID-IN-GLASS THERMOMETERS

A. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Trerice, H. O. Co.
b. Weiss Instruments, Inc.
c. Or approved equal.

2. Standard: ASME B40.200.
3. Case: Cast aluminum; 7-inch (178-mm) nominal size unless otherwise indicated.
4. Case Form: Straight unless otherwise indicated.
5. Tube: Glass with magnifying lens and blue or red organic liquid.

6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F (deg C).
7. Window: Glass.
8. Stem: Aluminum and of length to suit installation.

    a. Design for Thermowell Installation: Bare stem.

9. Connector: 1-1/4 inches (32 mm), with ASME B1.1 screw threads.
10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.3 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: CNR.
4. Material for Use with Steel Piping: CRES.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, (DN 15, DN 20, or NPS 25,) ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch (13, 19, and 25 mm), with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.4 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AMETEK, Inc.; U.S. Gauge.
    b. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
    c. Weiss Instruments, Inc.

2. Standard: ASME B40.100.
3. Case: Liquid-filled type(s); cast aluminum or drawn steel; 4-1/2-inch (114-mm) nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.

6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi (kPa).
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Metal.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.5 TEST PLUGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Trerice, H. O. Co.
2. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
3. Weiss Instruments, Inc.

B. Description: Test-station fitting made for insertion into piping tee fitting.

C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.

D. Thread Size: NPS 1/4 (DN 8) or NPS 1/2 (DN 15), ASME B1.20.1 pipe thread.

E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F (3450 kPa at 93 deg C).

F. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.

B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.

C. Install thermowells with extension on insulated piping.

D. Fill thermowells with heat-transfer medium.

E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.

G. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

H. Install remote-mounted pressure gages on panel.

I. Install valve and snubber in piping for each pressure gage for fluids.

J. Install test plugs in piping tees.

K. Install thermometers in the following locations:

1. Inlet and outlet of each water heater.

L. Install pressure gages in the following locations:

1. Building water service entrance into building.
2. Inlet and outlet of each pressure-reducing valve.
3. Suction and discharge of each domestic water pump.

3.2 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

3.3 ADJUSTING

A. Adjust faces of meters and gages to proper angle for best visibility.

3.4 THERMOMETER SCHEDULE

A. Thermometers at inlet and outlet of each domestic water heater shall be one of the following:

1. Liquid-filled, bimetallic-actuated type.
2. Direct-mounted, metal-case, vapor-actuated type.
3. Industrial-style, liquid-in-glass type.
4. Direct-mounted, light-activated type.
5. Test plug with chlorosulfonated polyethylene synthetic self-sealing rubber inserts.

B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

A. Scale Range for Domestic Cold-Water Piping: 0 to 150 deg F (Minus 20 to plus 70 deg C).

B. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F (0 to 150 deg C).

3.6 PRESSURE-GAGE SCHEDULE

A. Pressure gages at discharge of each water service into building shall be the following:

1. Liquid-filled, direct -mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic self-sealing rubber inserts.

B. Pressure gages at inlet and outlet of each water pressure-reducing valve shall be the following:

1. Liquid-filled Solid-front, pressure-relief, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic self-sealing rubber inserts.

C. Pressure gages at suction and discharge of each domestic water pump shall be the following:

1. Liquid-filled, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic self-sealing rubber inserts.

3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range for Water Service Piping: 0 to 160 psi (0 to 1100 kPa).

B. Scale Range for Domestic Water Piping: 0 to 160 psi (0 to 1100 kPa).

END OF SECTION 220519

SECTION 22 05 23.12

BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1. Certification that products comply with NSF 61 Annex G.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and soldered ends.
3. Set ball valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.
2. ASME B16.5 for flanges on steel valves.
3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
4. ASME B16.18 for solder-joint connections.
5. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 Annex G for valve materials for potable-water service.

D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Actuator Types:

1. Gear Actuator: For quarter-turn valves NPS 4 (DN 100) and larger.
2. Handlever: For quarter-turn valves smaller than NPS 4 (DN 100).

H. Valves in Insulated Piping:

1. Include 2-inch (50-mm) stem extensions.
2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

A. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

1. Description:

a. Standard: MSS SP-110.
b. CWP Rating: 600 psig (4140 kPa).
c. Body Design: Two piece.
d. Body Material: Bronze.
e. Ends: Threaded or soldered.
f. Seats: PTFE.
g. Stem: Stainless steel.

h. Ball: Stainless steel, vented.
i. Port: Full.

B. Bronze Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:

1. Description:

a. Standard: MSS SP-110.
b. CWP Rating: 600 psig (4140 kPa).
c. Body Design: Three piece.
d. Body Material: Bronze.
e. Ends: Threaded.
f. Seats: PTFE.
g. Stem: Stainless steel.
h. Ball: Stainless steel, vented.
i. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
4. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 PSIG (1035 kPa) OR LESS)

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.
3. Bronze ball valve, three-piece with full port and stainless-steel trim.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Bronze Valves: Provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.
3. Bronze ball valve, three-piece with full port and stainless-steel trim.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.
3. Bronze ball valves, three-piece with full port and stainless-steel trim.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.
3. Bronze ball valves, three-piece with full port and stainless-steel trim.

END OF SECTION 220523.12

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Pipe positioning systems.
8. Equipment supports.

B. Related Sections:

1. Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.2 Metal Framing systems (Trapeze Hanger)

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Unistrut Corporation; Tyco International, Ltd.
    b. Cooper B-Line, Inc.
    c. Or approved equal.

2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
7. Metallic Coating: Hot-dipped galvanized.

2.3 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.4 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.5 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Fastener System Installation:

1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. See Division 22 plumbing fixture Sections for requirements for pipe positioning systems for plumbing fixtures.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
   b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications.

F. Use padded hangers for piping that is subject to scratching.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.
3. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
4. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.

I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. C-Clamps (MSS Type 23): For structural shapes.
5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
6. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
7. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
8. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
10. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

L. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 22 05 48

VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe-riser resilient supports.
2. Restraint channel bracings.
3. Restraint cables.
4. Seismic-restraint accessories.
5. Mechanical anchor bolts.

B. Related Requirements:

1. Section 230548 "Vibration and Seismic Controls for HVAC" for devices for HVAC equipment and systems.

1.3 DEFINITIONS

A. IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.

a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.

b. Annotate to indicate application of each product submitted and compliance with requirements.

B. Shop Drawings:

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for plumbing piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.

B. Qualification Data: For professional engineer.

C. Welding certificates.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPM number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Assigned Seismic Use Group or Building Category as Defined in the IBC: II.

a. Component Importance Factor: 1.0.
b. Component Response Modification Factor: 2.5.
c. Component Amplification Factor: 2.5.

2. Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

a. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they are subjected.

2.2 RESTRAINT CHANNEL BRACINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hilti, Inc.
3. Mason Industries, Inc.

B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.3 MECHANICAL ANCHOR BOLTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hilti, Inc.
3. Mason Industries, Inc.

B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

C. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m) o.c.
3. Brace a change of direction longer than 12 feet (3.7 m).

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

I. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Section 221116 "Domestic Water Piping" for piping flexible connections.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION 220548

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Valve tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Stainless steel, 0.025-inch (0.64-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm)high.

2.3 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Pipe Label Color Schedule:

1. Domestic Water Piping:

    a. Background Color: Green.
    b. Letter Color: White.

2. Compressed Air Piping:

    a. Background Color: Green.
    b. Letter Color: White.
    c.

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. Cold Water: 1-1/2 inches (38 mm), round.
b. Hot Water: 1-1/2inches (38 mm), round.

END OF SECTION 220553

SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic hot-water piping.
2. Domestic recirculating hot-water piping.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
3. Detail removable insulation at piping specialties, equipment connections, and access panels.
4. Detail application of field-applied jackets.
5. Detail application at linkages of control devices.

C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Preformed Pipe Insulation Materials: 12 inches (300 mm) long by NPS 2 (DN 50).
2. Jacket Materials for Pipe: 12 inches (300 mm) long by NPS 2 (DN 50).
3. Sheet Jacket Materials: 12 inches (300 mm) square.
4. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Johns Manville; Micro-Lok.
   b. Knauf Insulation; 1000-Degree Pipe Insulation.
   c. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F (454 Deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Ramco Insulation, Inc.; Super-Stik.
   b. Or approved equal.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
    b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
    c. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.5 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Plumberex.
    b. Truebro; a brand of IPS Corporation.
    c. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot-water supply and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

C. Install insulation with longitudinal seams at top and bottom of horizontal runs.

D. Install multiple layers of insulation with longitudinal and end seams staggered.

E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

J. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

K. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

N. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.8 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 (DN 32) and Smaller: Insulation shall be the following:

   a. .Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch (13 mm) thick.

2. NPS 1-1/2 (DN 40 and Larger: Insulation shall be the following:

   a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch (25 mm) thick.

END OF SECTION 220719

SECTION 22 08 00

COMMISSIONING OF PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The requirements of this Section apply to all sections of Division 22.

B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned are specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. A Commissioning Agent/Provider/Specialist appointed by the Owner's Representative will manage the commissioning process.

1.2 RELATED WORK

A. Division 01 GENERAL REQUIREMENTS.

B. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

1.3 SUMMARY

A. This Section includes requirements for commissioning plumbing systems, subsystems and equipment. This Section supplements the general requirements specified in Section 01 91 13 General Commissioning Requirements.

B. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for more specifics regarding processes and procedures as well as roles and responsibilities for all Commissioning Team members.

1.4 DEFINITIONS

A. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for definitions.

1.5 COMMISSIONED SYSTEMS

A. Commissioning of a system or systems specified in Division 22 is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's Operation and Maintenance personnel in accordance with the requirements of Section 01 91 13 and of Division 22, is required in cooperation with the Owner and the Commissioning Agent.

B. The Plumbing systems commissioning will include the systems listed in Section 01 91 13 General Commissioning Requirements:

1.6 SUBMITTALS

B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION INSPECTIONS

A. Commissioning of the Building Plumbing Systems will require inspection of individual elements of the Plumbing construction throughout the construction period. The Contractor shall coordinate with the Commissioning Agent in accordance with Section 01 91 13 and the Commissioning Plan to schedule inspections as required to support the commissioning process.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the Owner and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the type of equipment will be returned to the Contractor for correction and resubmission. Refer to SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

3.3 CONTRACTORS TESTS

A. Contractor tests as required by other sections of Division 22 shall be scheduled and documented in accordance with Division 01 GENERAL REQUIREMENTS. All testing shall be incorporated into the project schedule. Contractor shall provide no less than 7 calendar days' notice of testing. The Commissioning Agent will witness selected Contractor tests at the sole discretion of the Commissioning Agent. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

3.4 SYSTEMS FUNCTIONAL PERFORMANCE TESTING:

A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the Resident Engineer. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor and witnesses of the tests shall sign and date a testing attendance form to verify tests were performed. See Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

3.5 TRAINING OF OWNERS PERSONNEL

A. Training of the Owner maintenance personnel is required in cooperation with the Resident Engineer and Commissioning Agent. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. Contractor shall submit training agendas, trainer resumes, and a training attendance form in accordance with the requirements of Section 01 91 13. These documents will be reviewed by the Commissioning Agent and included in the Final Commissioning Report. The instruction shall be scheduled in coordination with the Resident Engineer after submission and approval of formal training plans. Refer to Section 01 79 00 DEMONSTRATION AND TRAINING REQUIREMENTS, 01 91 13 GENERAL COMMISSIONING REQUIREMENTS and Division 22 Sections for additional Contractor training requirements.

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes domestic water piping inside the building.

A. Related Sections include the following:

1. Division 22 Section "Domestic Water Piping Specialties" for water distribution piping specialties.

1.3 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing domestic water piping systems with 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Water Samples: Specified in Part 3 "Cleaning" Article.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Pipe and Fitting Applications" Article for applications of pipe, tube, fitting, and joining materials.

B. Transition Couplings for Aboveground Pressure Piping: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2.3 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
4. Copper, Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 584 bronze castings.

a. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.

2.4 VALVES

A. Bronze general-duty valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

B. Balancing and drain valves are specified in Division 22 Section "General Duty Valves for Plumbing Piping."

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavating, trenching, and backfilling are specified in Division 02 Section "Earth Moving."

3.2 PIPE AND FITTING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

B. Flanges may be used on aboveground piping, unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water piping, NPS 2 (DN 50) and smaller, shall be the following:

1. Hard or soft copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and brazed joints.

E. Aboveground Domestic Water Piping: Use the following piping materials for each size range:

1. NPS 1 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. NPS 1-1/4 and NPS 1-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
3. NPS 2: Hard copper tube, Type L with grooved ends; copper grooved-end fittings; grooved-end-tube couplings; and grooved joints.

3.3 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use bronze ball valves for piping NPS 2 and smaller. Use bronze ball valves with flanged ends for piping NPS 2-1/2 and larger.
2. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.

B. Bronze, grooved-end valves may be used with grooved-end piping.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

1. Install hose-end drain valves at low points in water mains, risers, and branches.
2. Install stop-and-waste drain valves where indicated.

D. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Division 22 Section "General Duty Valves for Plumbing Piping."

3.4 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Division 23 Section "Basic Mechanical Materials and Methods."

B. Install under-building-slab copper tubing according to CDA's "Copper Tube Handbook."

C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 23 Section "Basic Mechanical Materials and Methods."

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Pressure gages are specified in 22 Section "Meters and Gages for Plumbing Piping" and drain valves and strainers are specified in Division 22 Section "General Duty Valves for Plumbing Piping."

E. Install domestic water piping level without pitch and plumb.

3.5 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 23 Section "Basic Mechanical Materials and Methods."

B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy silver solder; and ASTM B 828 procedure, unless otherwise indicated.

C. Grooved Joints: Assemble joints with grooved-end-pipe or grooved-end-tube coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

3.6 HANGER AND SUPPORT INSTALLATION

A. Pipe hanger and support devices are specified in Division 22 Section "Hangers and Supports for Plumbing piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.

4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.
7. NPS 8: 10 feet with 3/4-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:

1. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code.
3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 FIELD QUALITY CONTROL

A. Inspect domestic water piping as follows:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

    a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test domestic water piping as follows:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.9 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

A. Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 221116

SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following domestic water piping specialties:

1. Backflow preventers.
2. Balancing valves.
3. Strainers.
4. Hose bibbs.
5. Wall hydrants.
6. Drain valves.
7. Water hammer arresters.
8. Trap-seal primer valves.

B. Related Sections include the following:

1. Division 22 Section "Meters and Gages For Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

A. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Woodford Manufacturing Company.
b. Zurn Plumbing Products Group; Wilkins Div.
c. Watts Industries, Inc.; Water Products Div.
d. MIFAB, Inc.

2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Chrome or nickel plated.

2.2 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. FEBCO; SPX Valves & Controls.
b. Watts Industries, Inc.; Water Products Div.
c. Zurn Plumbing Products Group; Wilkins Div.

2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Body: Bronze for and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for and larger.
5. End Connections: Threaded.
6. Configuration: Designed for horizontal, straight through flow.
7. Accessories:

a. Valves: Ball type with threaded ends on inlet and outlet of and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of and larger.
b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

B. Hose-Connection Backflow Preventers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Conbraco Industries, Inc.
   b. Watts Industries, Inc.; Water Products Div.
   c. Woodford Manufacturing Company.

2. Standard: ASSE 1052.
3. Operation: Up to back pressure.
4. Inlet Size:3/4".
5. Outlet Size: Garden-hose thread complying with ASME B1.20.7.
6. Capacity: At least flow.

2.3 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide a product by one of the following:

   a. Taco, Inc.
   b. Watts Industries, Inc.; Water Products Div.
   c. NIBCO INC.

4. Type: Ball valve with two readout ports and memory setting indicator.
5. Body: Bronze,
6. Size: Same as connected piping, but not larger than.
7. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.4 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: minimum, unless otherwise indicated.
2. Body: Bronze for and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for and larger.
3. End Connections: Threaded and smaller;flanged for and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Drain: Factory-installed, hose-end drain valve.

2.5 HOSE BIBBS

A. Hose Bibbs HB-1

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Josam Company
    b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc,
    c. Zurn Plumbing Products Group; Light Commercial Operation

2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Operation: Loose Key.
4. Outlet: Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011; and garden-hose thread complying with ASME B1.20.7.
5. Box: Deep, flush mounting with cover.
6. Box and Cover Finish: Chrome plated.
7. Outlet: Expsed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011; and garden-hose thread complying with ASME B1.20.7
8. Nozzle and Wall-Plate Finish: Polished nickel bronze.
9. Operating Key(s): Two with each wall hydrant.

B. Hose Bibbs HB-2:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 3/4 (DN 20) threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig (860 kPa).
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Loose operating key.
12. Operation for Service Areas: Operating key.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.6 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: minimum CWP.
3. Body: Copper alloy.

4. Ball: Chrome-plated brass.
5. Seats and Seals: Replaceable.
6. Handle: Vinyl-covered steel.
7. Inlet: Threaded or solder joint.
8. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.7 WATER HAMMER ARRESTERS

A. Water Hammer Arresters WHA:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   b. PPP Inc.
   c. MIFAB, Inc.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.8 TRAP-SEAL PRIMER VALVES

A. Supply-Type (Single), Trap-Seal Primer Valves TP-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. MIFAB, Inc.
   b. PPP Inc.
   c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

2. Standard: ASSE 1018.
3. Pressure Rating: minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Division 23 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.

B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
3. Do not install bypass piping around backflow preventers.

C. Install balancing valves in locations where they can easily be adjusted.

D. Install Y-pattern strainers for water on supply side of each solenoid valve, and pump.

E. Install water hammer arresters in water piping according to PDI-WH 201.

F. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Reduced-pressure-principle backflow preventers.
2. Double-check backflow-prevention assemblies.
3. Calibrated balancing valves.
4. Supply-type, trap-seal primer valves.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 23 Section "Mechanical Identification."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and prepare test reports:

1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.

B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.5 ADJUSTING

A. Set field-adjustable pressure set points of water pressure-reducing valves.

B. Set field-adjustable flow set points of balancing valves.

C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION 221119

SECTION 22 11 23

DOMESTIC WATER PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. In-line, sealless centrifugal pumps.

1.3 DEFINITIONS

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include materials of construction, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water pumps to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Retain shipping flange protective covers and protective coatings during storage.

B. Protect bearings and couplings against damage.

C. Comply with pump manufacturer's written rigging instructions for handling.

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 IN-LINE, SEALLESS CENTRIFUGAL PUMPS

A. Grundfos

B. Bell and Gossett

C. Taco Pumps

D. Description: Factory-assembled and -tested, in-line, close-coupled, canned-motor, sealless, overhung-impeller centrifugal pumps.

E. Pump Construction:

1. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge type with motor and impeller on common shaft and designed for installation with pump and motor shaft horizontal.
2. Casing: Bronze, with threaded or companion-flange connections.
3. Impeller: Plastic.
4. Motor: Single speed, unless otherwise indicated.

F. Capacities and Characteristics:

1. Capacity: 3 gpm.
2. Total Dynamic Head: 20 feet.
3. Minimum Working Pressure: 125 psig (860 kPa).
4. Maximum Continuous Operating Temperature: 220 deg F (104 deg C).
5. Inlet and Outlet Size: 3/4”
6. Pump Speed: 3250
7. Pump Control: Aquastat.
8. Motor Horsepower: 1/12.
9. Electrical Characteristics:

    a. Volts: 115.
    b. Phases: Single.
    c. Hertz: 60.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.3 CONTROLS

A. Thermostats: Electric; adjustable for control of hot-water circulation pump.

1. Type: Water-immersion temperature sensor, for installation in piping.
2. Range: 65 to 200 deg F (18 to 93 deg C).
3. Enclosure: NEMA 250.
4. Operation of Pump: On or off.
5. Transformer: Provide if required.
6. Power Requirement: 115 V, ac.
7. Settings: Start pump at 115 deg F (46 deg C) and stop pump at 120 deg F (49 deg C).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of domestic-water-piping system to verify actual locations of connections before pump installation.

3.2 PUMP INSTALLATION

A. Comply with HI 1.4.

B. Install in-line, sealless centrifugal pumps with shaft horizontal unless otherwise indicated.

C. Install thermostats in hot-water return piping.

3.3 CONNECTIONS

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to pumps to allow service and maintenance.

C. Connect domestic water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.

D. Install shutoff valve and strainer on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for valves specified in Section 220523.12 "Ball Valves for Plumbing Piping," and comply with requirements for strainers specified in Section 221119 "Domestic Water Piping Specialties."

E. Connect thermostats to pumps that they control.

3.4 IDENTIFICATION

A. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping.
4. Set thermostats for automatic starting and stopping operation of pumps.
5. Perform the following startup checks for each pump before starting:

    a. Verify bearing lubrication.
    b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    c. Verify that pump is rotating in the correct direction.

6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
7. Start motor.
8. Open discharge valve slowly.
9. Adjust temperature settings on thermostats.
10. Adjust timer settings.

3.6 ADJUSTING

A. Adjust domestic water pumps to function smoothly,and lubricate as recommended by manufacturer.

B. Adjust initial temperature set points.

C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION 221123

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following for soil, waste, and vent piping inside the building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.
3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

1.4 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Shop Drawings:

1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.

C. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping;

"NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

1. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, 4 stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.

a. Manufacturers:

1) Husky.
2) Clamp-All Corp.
3) Mission Rubber Co.

2.4 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Description: ASTM A 674 or AWWA C105, high-density, crosslaminated PE film of 0.004-inch or LLDPE film of 0.008-inch minimum thickness.

B. Form: Sheet or tube.

C. Color: Black.

3.1 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:

1. Hubless cast-iron soil pipe and fittings; heavy-duty shielded couplings; and hubless-coupling joints.

C. Aboveground, vent piping NPS 4 and smaller shall be any of the following:

1. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel and rigid, unshielded couplings; and hubless-coupling joints.

D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Hubless cast-iron soil pipe and fittings; heavy-duty shielded couplings; and hubless-coupling joints.

E. Aboveground, condensate drain piping shall be any of the following:

F. 1. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, drawn temper.

3.2 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Division 23 Section "Basic Materials and Methods."

B. Install seismic restraints on piping.

C. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

D. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

E. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

F. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for all piping.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

G. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

H. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 23 Section "Basic Mechanical Materials and Methods."

B. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

3.4 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Install individual, straight, horizontal piping runs according to the following:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.6 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.7 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 22 13 19

DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following plumbing specialties:

1. Balancing valves.
2. Water Filters.
3. Cleanouts.
4. Floor sinks.
5. Floor Drains.

1.3 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:

1. Domestic Water Piping: 125 psig.
2. Sanitary Waste and Vent Piping: 10-foot head of water.

1.4 SUBMITTALS

A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:

1. Balancing valves, water filters, and strainers.
2. Thermostatic water mixing valves and water tempering valves.
3. Water hammer arresters, air vents, and trap seal primer valves and systems.
4. Drain valves, hose bibbs, hydrants, and hose stations.
5. Sleeve penetration systems.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field test reports.

D. Maintenance Data: For plumbing specialties to include in maintenance manuals. Include the following:

1. Water filters.
2. Thermostatic water mixing valves and water tempering valves.
3. Trap seal primer valves and systems.

1.5 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of plumbing specialties and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

B. Plumbing specialties shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for piping materials and installation.

E. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components. Include marking "NSF-pw" on plastic potable-water piping and "NSF-dwv" on plastic drain, waste, and vent piping.
2. Comply with NSF 61, "Drinking Water System Components--Health Effects, Sections 1 through 9," for potable domestic water plumbing specialties.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Water Filter Cartridges: Equal to 200 percent of amount installed for each type and size indicated.
2. Operating Key Handles: Equal to 100 percent of amount installed for each key-operated hose bibb and hydrant installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 BALANCING VALVES

A. Calibrated Balancing Valves: Adjustable, with two readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.

1. Manufacturers:

   a. Amtrol, Inc.
   b. Taco, Inc.
   c. Watts Industries, Inc.; Water Products Div.

2. NPS 2 and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.
3. NPS 2 and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.
4. NPS 2-1/2 and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.

2.3 WATER FILTERS

A. Manufacturers:

1. Filtrine Manufacturing Company; Drinking Water Division.
2. Osmonics.
3. PURA, Inc.
4. U.S. Filter; Filterite Div.
5. Watts Industries, Inc.; Water Products Div.

B. General: Cartridge-type assemblies suitable for potable water. Include housing, fittings, filter cartridges, and cartridge end caps.

2.4 CLEANOUTS

A. Cleanouts, WCO: Comply with ASME A112.36.2M or ASME A112.3.1.

1. Application: Wall cleanout.
2. Products:

   a. Josam Co.
   b. Smith, Jay R. Mfg. Co.
   c. Zurn Industries, Inc., Specification Drainage Operation

3. Body or Ferrule Material: Cast iron.
4. Clamping Device: Required.
5. Outlet Connection: Threaded.
6. Closure: Brass plug with straight threads and gasket.
7. Adjustable Housing Material: Cast iron with threads.
8. Frame and Cover Material and Finish: Polished bronze.
9. Frame and Cover Shape: Round.

2.5 FLOOR SINKS

A. Floor Sinks, FS-1: Comply with ASME A12.21.1M.

1. Application: Floor Sink.
2. Products:

   a. Josam Co.
   b. Smith, Jay R. Mfg. Co.; Fig 3100.
   c. Zurn Industries, Inc., Specification Drainage Operation; Model No. Z-1910.

3. Body Material: Gray iron.
4. Seepage Flange: Required.
5. Clamping Device: Required.
6. Outlet: Bottom.
7. Exposed Surfaces and Interior Lining: Acid-resistant enamel.
8. Sediment Bucket: Not required.
9. Top Material: Gray iron.
10. Top Shape: Square.
11. Dimensions of Top or Strainer: 8-1/2 inch square.
12. Top Loading Classification: Medium Duty.
13. Trap Material: Cast iron.
14. Trap Pattern: Standard P-trap.
15. Trap Features: Trap seal primer valve drain connection.

2.6 FLOOR DRAINS

A. Cast-Iron Floor Drains FD-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Jay R. Smith Mfg. Co.
   b. WATTS.
   c. Zurn Industries, LLC.

2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Anchor Flange: Required.
7. Clamping Device: Not required.
8. Outlet: Bottom.
9. Backwater Valve: Not required.
10. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
11. Sediment Bucket: Not required.
12. Top or Strainer Material: Nickel bronze.
13. Top of Body and Strainer Finish: Nickel bronze.
14. Top Shape: Round.
15. Dimensions of Top or Strainer: 5-inch.
16. Top Loading Classification: Medium Duty.
17. Funnel: Not required.

18. Trap Material: Cast iron.
19. Trap Pattern: Standard P-trap.
20. Trap Features: Trap-seal primer valve drain connection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Division 23 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and basic installation requirements.

B. Install expansion joints on vertical risers, stacks, and conductors if indicated.

C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

D. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.

E. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

F. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.

G. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.

H. Fasten recessed-type plumbing specialties to reinforcement built into walls.

I. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.

J. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

K. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipefittings.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect plumbing specialties to piping specified in other Division 22 Sections.

D. Ground equipment.

E. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

F. Connect plumbing specialties and devices that require power according to Division 26 Sections.

3.3 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each backflow preventer, thermostatic water mixing valve, and trap seal primer system.

1. Text: Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
2. Refer to Division 23 Section "Identification for HVAC Piping and Equipment" for nameplates and signs.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled trap seal primer systems and their installation, including piping and electrical connections. Report results in writing.

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain trap seal primer systems. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 221319

SECTION 22 14 13

FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water (30 kPa).

B. Seismic Performance: Storm drainage piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For storm drainage piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Storm-Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of storm-drainage service.
2. Do not proceed with interruption of storm-drainage service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Heavy-Duty, Hubless-Piping Couplings:

1. Standards: ASTM C 1277 and ASTM C 1540.
2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.

3. Shielded, Nonpressure Transition Couplings:

a. Standard: ASTM C 1460.

b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Standard: ASTM A 674 or AWWA C105.

B. Material: High-density, crosslaminated PE film of 0.004-inch (0.10-mm) or LLDPE film of 0.008-inch (0.20-mm) minimum thickness.

C. Form: Sheet or tube.

D. Color: Black.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations from layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install piping to allow application of insulation.

I. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

J. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building storm drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

L. Install storm drainage piping at the following minimum slopes unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

N. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.

O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hubless, Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet (30 m) if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting, and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
4. NPS 6 and NPS 8 (DN 150 and DN 200): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
5. NPS 10 and NPS 12 (DN 250 and DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.
6. Spacing for 10-foot (3-m) pipe lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).

G. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.6 IDENTIFICATION

A. Identify exposed storm drainage piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of

water (30 kPa). From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.8 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground storm drainage piping NPS 6 (DN 150) and smaller shall be the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty, hubless-piping couplings; and coupled joints.

C. Underground storm drainage piping NPS 6 (DN 150) and smaller shall be any of the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty, hubless-piping couplings; and coupled joints.

END OF SECTION 221413

SECTION 22 14 23

STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof drains.
2. Overflow Roof Drains
3. Miscellaneous storm drainage piping specialties.
4. Through-penetration firestop assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 METAL ROOF DRAINS

A. Cast-Iron, General-Purpose Roof Drains RD-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MIFAB, Inc.
b. Smith, Jay R. Mfg. Co.
c. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.6.4, for general-purpose roof drains.

3. Body Material: Cast iron.
4. Dimension of Body: 8- to 12-inch (203- to 305-mm) diameter.
5. Combination Flashing Ring and Gravel Stop: Required.
6. Flow-Control Weirs: Required.
7. Outlet: Bottom.
8. Extension Collars: Required.
9. Underdeck Clamp: Required.
10. Expansion Joint: Not required.
11. Sump Receiver Plate: Required.
12. Dome Material: Cast iron.
13. Wire Mesh: Not required.
14. Perforated Gravel Guard: Not required.
15. Vandal-Proof Dome: Not required.
16. Water Dam: Not required.

B. Cast-Iron, General-Purpose Roof Drains ORD-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. MIFAB, Inc.
   b. Smith, Jay R. Mfg. Co.
   c. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.6.4, for general-purpose roof drains.
3. Body Material: Cast iron.
4. Dimension of Body: 8- to 12-inch (203- to 305-mm) diameter.
5. Combination Flashing Ring and Gravel Stop: Required.
6. Flow-Control Weirs: Required.
7. Outlet: Bottom.
8. Extension Collars: Required.
9. Underdeck Clamp: Required.
10. Expansion Joint: Not required.
11. Sump Receiver Plate: Required.
12. Dome Material: Cast iron.
13. Wire Mesh: Not required.
14. Perforated Gravel Guard: Not required.
15. Vandal-Proof Dome: Not required.
16. Water Dam: 2 inches (51 mm) high.

2.2 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

2.3 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ProSet Systems Inc.
b. Or approved equal.

2. Standard: ASTM E 814, for through-penetration firestop assemblies.
3. Certification and Listing: Intertek Testing Service NA for through-penetration firestop assemblies.
4. Size: Same as connected pipe.
5. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
6. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
7. Special Coating: Corrosion resistant on interior of fittings.

2.4 FLASHING MATERIALS

A. Copper Sheet: ASTM B 152/B 152M,12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm thickness).

B. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch (1.01-mm) minimum thickness unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.

C. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

D. Fasteners: Metal compatible with material and substrate being fastened.

E. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

F. Solder: ASTM B 32, lead-free alloy.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.

1. Install flashing collar or flange of roof drain to prevent leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
2. Install expansion joints, if indicated, in roof drain outlets.
3. Position roof drains for easy access and maintenance.

B. Install downspout adapters on outlet of back-outlet parapet roof drains and connect to sheet metal downspouts.

C. Install cleanouts in aboveground piping and building drain piping according to the following instructions unless otherwise indicated:

1. Use cleanouts the same size as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
3. Locate cleanouts at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
4. Locate cleanouts at base of each vertical soil and waste stack.

D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

F. Install wall cleanouts in vertical conductors. Install access door in wall if indicated.

G. Install through-penetration firestop assemblies in plastic conductors at concrete floor penetrations.

H. Install sleeve flashing device with each conductor passing through floors with waterproof membrane.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 15160 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.3 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221423

SECTION 22 34 00

FUEL-FIRED, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Commercial, atmospheric, gas-fired, storage, domestic-water heaters.
2. Domestic-water heater accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Equipment room drawing or BIM model, drawn to scale, on which the items described in this Section are shown and coordinated with all building trades.

B. Seismic Qualification Data: Certificates, for fuel-fired, domestic-water heaters, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Product Certificates: For each type of Commercial, gas-fired, domestic-water heater.

D. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

E. Source quality-control reports.

F. Field quality-control reports.

G. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuel-fired, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Commercial, Gas-Fired, Storage, Domestic-Water Heaters:

1) Storage Tank: Five years.
2) Controls and Other Components: One year(s).

b. Expansion Tanks: Five years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.

B. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
2. Component Importance Factor: 1.0.
3. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube, domestic-water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.

C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

2.2 COMMERCIAL, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS

A. Commercial, Atmospheric, Gas-Fired, Storage, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. A. O. Smith Corporation.
    b. Bock Water Heaters, Inc.
    c. Lochinvar, LLC.

2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
3. Standard: ANSI Z21.10.3/CSA 4.3.
4. Storage-Tank Construction: Non-ASME-code steel with 150-psig (1035-kPa) working-pressure rating.

    a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.

        1) NPS 2 (DN 50) and Smaller: Threaded ends in accordance with ASME B1.20.1.
        2) NPS 2-1/2 (DN 65) and Larger: Flanged ends in accordance with ASME B16.5 for steel and stainless steel flanges and in accordance with ASME B16.24 for copper and copper-alloy flanges.

    b. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    c. Lining: Glass complying with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.

5. Factory-Installed, Storage-Tank Appurtenances:

    a. Anode Rod: Replaceable magnesium.
    b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    c. Drain Valve: Corrosion-resistant metal with hose-end connection.
    d. Insulation: Comply with ASHRAE/IES 90.1. Surround entire storage tank except connections and controls.
    e. Jacket: Steel with enameled finish.
    f. Burner: For use with atmospheric, gas-fired, domestic-water heaters and natural-gas fuel.
    g. Ignition: Standing pilot or ANSI Z21.20/CSA C22.2 No. 60730-2-5, electric, automatic, gas-ignition system.
    h. Temperature Control: Adjustable thermostat.

i. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
j. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select one relief valve with sensing element that extends into storage tank.

6. Special Requirements: NSF 5 construction.
7. Draft Hood: Draft diverter, complying with ANSI Z21.12.
8. Automatic Damper: ANSI Z21.66/CSA 6.14, thermally activated, automatic-vent-damper device with size matching draft hood.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AMTROL, Inc.
b. TACO Comfort Solutions, Inc.

2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
3. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
4. Construction:

a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
b. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
c. Air-Charging Valve: Factory installed.

5. Capacity and Characteristics:

a. Working-Pressure Rating: 100 psig (690 kPa).
b. Capacity Acceptable: 3.2 gal. minimum.
c. Air Precharge Pressure: 80.

B. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 (DN 20) with ASME B1.20.1 pipe threads.

C. Comply with requirements for ball-, butterfly-, or gate-type shutoff valves specified in Section 220523.12 "Ball Valves for Plumbing Piping."

1. Comply with requirements for balancing valves specified in Section 221119 "Domestic Water Piping Specialties."

D. Gas Shutoff Valves: ANSI Z21.15/CSA 9.1, manually operated. Furnish for installation in piping.

E. Gas Pressure Regulators: ANSI Z21.18/CSA 6.3, appliance type. Include 1/2-psig (3.5-kPa) pressure rating as required to match gas supply.

F. Automatic Gas Valves: ANSI Z21.21/CSA 6.5, appliance, electrically operated, on-off automatic valve.

G. Combination Temperature-and-Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.

1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4.

H. Pressure Relief Valves: Include pressure setting less than working-pressure rating of domestic-water heater.

1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4.

I. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Provide dimension that will support bottom of domestic-water heater minimum of 18 inches (457 mm) above the floor.

J. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect assembled domestic-water heaters specified to be ASME-code construction, in accordance with ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

C. Domestic-water heaters will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Domestic-Water Heater Mounting: Install commercial domestic-water heaters on concrete base. Comply with requirements for concrete base specified in Section 033000 "Cast-in-Place Concrete."

1. Exception: Omit concrete bases for commercial domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Install anchor bolts to elevations required for proper attachment to supported equipment.
8. Anchor domestic-water heaters to substrate.

B. Install domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523.12 "Ball Valves for Plumbing Piping,"

C. Install gas-fired, domestic-water heaters in accordance with NFPA 54.

1. Install gas shutoff valves on gas supply piping to gas-fired, domestic-water heaters without shutoff valves.
2. Install gas pressure regulators on gas supplies to gas-fired, domestic-water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
3. Install automatic gas valves on gas supplies to gas-fired, domestic-water heaters if required for operation of safety control.
4. Comply with requirements for gas shutoff valves, gas pressure regulators, and automatic gas valves specified in Section 231123 "Facility Natural-Gas Piping."

D. Install commercial domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment" and Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment."

E. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend domestic-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

F. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."

G. Install thermometer on outlet piping of domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

H. Assemble and install inlet and outlet piping manifold kits for multiple domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each domestic-water heater outlet. Comply with requirements for valves specified in Section 220523.12 "Ball Valves for Plumbing Piping," Section 220523.13 and comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

I. Fill domestic-water heaters with water.

J. Charge domestic-water expansion tanks with air to required system pressure.

K. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water shall contain less than 0.25 percent of lead by weight.

3.2 PIPING CONNECTIONS

A. Comply with requirements for domestic-water piping specified in Section 221116 "Domestic Water Piping."

B. Comply with requirements for gas piping specified in Section 231123 "Facility Natural-Gas Piping."

C. Drawings indicate general arrangement of piping, fittings, and specialties.

D. Where installing piping adjacent to fuel-fired, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Retain "Testing Agency" Paragraph below to require Contractor to hire an independent testing agency.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform tests and inspections with the assistance of a factory-authorized service representative.

E. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

F. Domestic-water heaters will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, gas-fired, storage, domestic-water heaters. Training shall be a minimum of one hour(s).

END OF SECTION 223400

SECTION 22 41 00

RESIDENTIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Faucets.
2. Bar sinks.
3. Kitchen sinks.
4. Disposers.
5. Supply fittings.
6. Waste fittings.

B. Related Requirements:

1. Section 224213.13 "Commercial Water Closets."
2. Section 224213.16 "Commercial Urinals."
3. Section 224216.13 "Commercial Lavatories."
4. Section 224216.16 "Commercial Sinks."
5. Section 224716 "Pressure Water Coolers."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted plumbing fixtures.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in emergency, operation, and operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SHOWER FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Shower Faucets SH-1: Single handle, pressure balance, mixing valve.

1. Single-Handle, Pressure-Balance Faucets:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Lawler Manufacturing Company, Inc.
2) Leonard Valve Company.
3) Moen Incorporated.
4) Or approved equal

2. Fixture:

a. Standard: ASME A112.18.1/CSA B125.1 and ASSE 1016.
b. General: Include hot- and cold-water indicators; check stops; and hand head complying with ASSE 1014 with arm, flange, hose, and bracket. Coordinate faucet inlets with supplies.
c. Body Material: Solid brass.
d. Finish: Polished chrome plate.
e. Maximum Flow Rate: 1.5 gpm unless otherwise indicated.
f. Mounting: Exposed.
g. Backflow-Prevention Device for Hand-Held Shower: Required.
h. Operation: Compression, manual.
i. Antiscald Device: Integral with mixing valve.
j. Check Stops: Check-valve type, integral with or attached to body; on hot- and cold-water supply connections.

3. Supply Connections: PS 1/2 (DN 15).
4. Shower Head:

    a. Type: Hand-held, hook mounted.
    b. Shower Head Material: Metallic with chrome-plated finish.
    c. Spray Pattern: Adjustable.
    d. Integral Volume Control: Required.
    e. Shower-Arm, Flow-Control Fitting: 1.5 gpm (5.7 L/min..

2.2 BAR SINKS

A. Bar Sinks S-1: Single bowl, counter mounted, stainless steel.

1. Stainless-Steel Bar Sinks:

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Elkay.
        2) Just Manufacturing.
        3) Or approved equal

2. Fixture:

    a. Standard: ASME A112.19.3/CSA B45.4 for stainless-steel lavatories.
    b. Type: Flat rim with ledge.
    c. Overall Dimensions:23.5 x 18.25.
    d. Bowl Dimensions: 21 x 15.75.

3. Faucet: S-1.
4. Supply Fittings: Comply with requirements in "Supply Fittings" Article.
5. Waste Fittings: Comply with requirements in "Waste Fittings" Article.

2.3 SINK FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Sink Faucets S-1: Solid brass, bar sink.

1. General-Duty, Solid-Brass Faucets:

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Chicago Faucets; Geberit Company.
        2) Delta Faucet Company.
        3) Elkay.
        4) Or approved equal

2. Standard: ASME A112.18.1/CSA B125.1.

3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
4. Kitchen Sink Option: Separate hand spray complying with ASSE 1025.
5. Finish: Polished chrome plate.
6. Maximum Flow Rate: 2.5 gpm (9.5 L/min.) unless otherwise indicated.
7. Mixing Valve: Two-lever handle.
8. Centers: 8 inches (203 mm).
9. Mounting: Deck, exposed.
10. Handle(s): Wrist blade, 4 inches (102 mm).
11. Spout Type: Swivel gooseneck.
12. Spout Outlet: Aerator.
13. Drain: Grid.

2.4 DISPOSERS

A. Disposers GD-1: Continuous-feed household, food waste.

1. Continuous-Feed Disposers:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Franke Consumer Products, Inc.
2) InSinkErator; Emerson Electric Co.
3) Or approved equal

2. Standards: ASSE 1008 and UL 430, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. General: Include reset button; wall switch; corrosion-resistant chamber with jam-resistant, cutlery- or stainless-steel grinder or shredder; NPS 1-1/2 (DN 40) outlet; quick-mounting, stainless-steel sink flange; antisplash guard; and combination cover/stopper.
4. Model: Sound-insulated chamber.
5. Motor: 115-V ac, 1725 rpm, 1/2 hp with overload protection.

2.5 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Bar Sink Supply Fittings:

1. Supply Piping: Chrome-plated-brass pipe or chrome-plated-copper tube matching water-supply piping size. Include chrome-plated wall flange.
2. Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression stop with inlet connection matching water-supply piping type and size.

a. Operation: Loose key.

3. Risers:

    a. Size: NPS 1/2 (DN 15) for bar sinks.
    b. Material: ASME A112.18.6, braided- or corrugated-stainless-steel flexible hose riser.

2.6 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/2 (DN 40) offset tailpiece for accessible bar sinks.

C. Trap:

1. Size: NPS 1-1/2 (DN 40) for bar sinks.
2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-(0.83-mm-) thick brass tube to wall; and chrome-plated-brass or -steel wall flange.

2.7 GROUT

A. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing-fixture installation.

B. Examine walls, floors, cabinets, and counters for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install plumbing fixtures level and plumb according to roughing-in drawings.

B. Install floor-mounted water closets on closet flange attachments to drainage piping.

C. Install counter-mounting fixtures in and attached to casework.

D. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

1. Exception: Use ball or gate valves if supply stops are not specified with fixture. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping" and Section 220523.15 "Gate Valves for Plumbing Piping."

E. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

F. Install shower flow-control fittings with specified maximum flow rates in shower arms.

G. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes unless otherwise indicated.

H. Install disposer in outlet of each sink indicated to have a disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.

I. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

J. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

K. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.4 ADJUSTING

A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of plumbing fixtures, inspect and repair damaged finishes.

B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed plumbing fixtures and fittings.

D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224100

SECTION 22 42 13.13

COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Water closets.
2. Flushometer valves and tanks.
3. Toilet seats.
4. Supports.

1.3 DEFINITIONS

A. Effective Flush Volume: Average of two reduced flushes and one full flush per fixture.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

PART 2 - PRODUCTS

2.1 WALL-MOUNTED WATER CLOSETS

A. Water Closets WC-1: Wall mounted, top spud.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard.
    b. Kohler Co.
    c. Zurn Industries, LLC.

2. Bowl:

    a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    b. Material: Vitreous china.
    c. Type: Siphon jet.
    d. Style: Flushometer valve.
    e. Height: Standard.
    f. Rim Contour: Elongated.
    g. Water Consumption: 1.28 gal. (4.8 L) per flush.
    h. Spud Size and Location: NPS 1-1/2 (DN 40); top.

3. Flushometer Valve: WC-1.
4. Toilet Seat: WC-1.
5. Support: Water closet carrier.
6. Water-Closet Mounting Height: Standard.

B. Water Closets WC-2: Wall mounted, top spud, accessible.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard.
    b. Kohler Co.
    c. Zurn Industries, LLC.

2. Bowl:

    a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    b. Material: Vitreous china.
    c. Type: Siphon jet.
    d. Style: Flushometer valve.
    e. Height: Standard.
    f. Rim Contour: Elongated.

g. Water Consumption: 1.28 gal. (4.8 L) per flush.
h. Spud Size and Location: NPS 1-1/2 (DN 40); top.

3. Flushometer Valve: WC-2.
4. Toilet Seat: WC-2.
5. Support: Water closet carrier.
6. Water-Closet Mounting Height: Handicapped/elderly, complying with ICC/ANSI A117.1.

2.2 FLUSHOMETER VALVES

A. Battery-Powered, Solenoid-Actuator, Piston Flushometer Valves WC-1 and WC-2:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Sloan Valve Company.
b. TOTO USA, INC.
c. Zurn Industries, LLC.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig (860 kPa).
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Panel Finish: Chrome plated or stainless steel.
8. Style: Exposed.
9. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
10. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
11. Consumption: 1.28 gal. (4.8 L) per flush.
12. Minimum Inlet: NPS 1 (DN 25).
13. Minimum Outlet: NPS 1-1/4 (DN 32).

2.3 TOILET SEATS

A. Toilet Seats WC-1 and WC-2:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Bemis Manufacturing Company.
b. Church Seats; Bemis Manufacturing Company.
c. Olsonite Seat Co.

2. Standard: IAPMO/ANSI Z124.5.

3. Material: Plastic.
4. Type: Commercial (Heavy duty).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Noncorroding metal.
8. Seat Cover: Not required.
9. Color: White.

2.4 SUPPORTS

A. Water Closet Carrier:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Zurn Industries, LLC.
   b. Jay R Smith

2. Standard: ASME A112.6.1M.
3. Description: Waste-fitting assembly, as required to match drainage piping material and arrangement with faceplates, couplings gaskets, and feet; bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.

B. Examine walls and floors for suitable conditions where water closets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.

3. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.

C. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install actuators in locations that are easy for people with disabilities to reach.
4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Install toilet seats on water closets.

E. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed water closets and fittings.

C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION 224213.13

SECTION 22 42 13.16

COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urinals.
2. Flushometer valves.
3. Supports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

PART 2 - PRODUCTS

2.1 STALL URINALS

A. Urinals UR-1 and UR-2: Stall, washout type.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard.
b. Kohler Co.

2. Fixture:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Straight or sloped front.
d. Strainer: Separate; removable.
e. Water Consumption: Water saving.
f. Spud Size and Location: NPS 3/4 (DN 20); top.
g. Outlet Size and Location: NPS 2 (DN 50); bottom for separate trap.
h. Color: White.

3. Flushometer Valve: UR-1 and UR-2.

2.2 URINAL FLUSHOMETER VALVES

A. Battery-Powered, Solenoid-Actuator, Piston Flushometer Valves UR-1 and UR-2:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Sloan Valve Company.
b. TOTO USA, INC.
c. Zurn Industries, LLC.

2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig (860 kPa).
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Panel Finish: Chrome plated or stainless steel.
8. Style: Exposed.
9. Actuator: Solenoid complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
10. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
11. Consumption: 0.125 gal. per flush.

12. Minimum Inlet: NPS 3/4 (DN 20).
13. Minimum Outlet: NPS 3/4 (DN 20).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.

B. Examine walls and floors for suitable conditions where urinals will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.

B. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

C. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

D. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed urinals and fittings.

C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 224213.16

SECTION 22 42 16.13

COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring of automatic faucets.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. Servicing and adjustments of automatic faucets.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, COUNTER-MOUNTED LAVATORIES

A. Lavatory L-1: Oval, vitreous china, undercounter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard.
b. Kohler Co.
c. TOTO USA, INC.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For undercounter mounting.
c. Nominal Size: Oval, 22 by 14 inches (559 by 356 mm).
d. Faucet-Hole Punching: No holes.
e. Faucet-Hole Location: On countertop.
f. Color: White.
g. Mounting Material: Sealant and undercounter mounting kit.

3. Faucet: L-1.

2.2 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory L-2: Ledge back, vitreous china, wall mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Kohler Co model
b. American Standard America.
c. TOTO USA, INC.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.

b. Type: For wall hanging.
c. Nominal Size: 22 by 18 inches.
d. Faucet-Hole Punching: Three holes, 2-inch (51-mm) centers.
e. Faucet-Hole Location: Top.
f. Color: White.
g. Mounting Material: Chair carrier.

3. Faucet: L-2.
4. Support: ASME A112.6.1M, Type II, concealed-arm lavatory carrier.

2.3 SOLID-BRASS, AUTOMATICALLY OPERATED LAVATORY FAUCETS

A. NSF Standard: Comply with NSF 372 for faucet materials that will be in contact with potable water.

B. Lavatory Faucets L-1, L-2: Automatic-type, battery-powered electronic-sensor-operated, mixing, solid-brass valve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Chicago Faucets; Geberit Company.
b. T&S Brass and Bronze Works, Inc.
c. Zurn Industries, LLC.

2. Standards: ASME A112.18.1/CSA B125.1 and UL 1951.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
5. Body Type: Three hole.
6. Body Material: Commercial, solid brass.
7. Finish: Polished chrome plate.
8. Maximum Flow Rate: 0.5 gpm (1.5 L/min.).
9. Mounting Type: Deck, concealed.
10. Spout: Rigid type.
11. Spout Outlet: Aerator.
12. Drain: Grid.

2.4 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Loose key.

F. Risers:

1. NPS 1/2 (DN 15).
2. ASME A112.18.6, braided- or corrugated-stainless-steel, flexible hose riser.

2.5 WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/4 (DN 32) offset and straight tailpiece.

C. Trap:

1. Size: NPS 1-1/2 by NPS 1-1/4 (DN 40 by DN 32).
2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch- (0.83-mm-) thick brass tube to wall; and chrome-plated, brass or steel wall flange.
3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch- (0.30-mm-) thick stainless-steel tube to wall; and stainless-steel wall flange.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

B. Examine counters and walls for suitable conditions where lavatories will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install lavatories level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION 224216.13

SECTION 22 42 16.16

COMMERCIAL SINKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service sinks.
2. Sink faucets.

B. Related Requirements:

1. Section 224100 "Residential Plumbing Fixtures" for residential sinks.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sinks to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SERVICE SINKS

A. Service Sinks MS-1: Enameled, cast iron, floor mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Standard America.
    b. Commercial Enameling Company.
    c. Kohler Co.

2. Fixture:

    a. Standard: ASME A112.19.1/CSA B45.2.
    b. Style: With front apron and raised back.
    c. Nominal Size: 28 by 28 inches (710 by 710 mm).
    d. Color: White.
    e. Drain: Grid with NPS 3 (DN 80) outlet.
    f. Rim Guard: Coated wire.

3. Faucet: MS-1.

2.2 SINK FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.

B. Sink Faucets MS-1: Manual type, two-lever-handle mixing valve.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Chicago Faucets.
    b. Speakman Company.
    c. Or approved equal.

2. Standard: ASME A112.18.1/CSA B125.1.
3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
4. Body Type: Widespread.
5. Body Material: Commercial, solid brass.
6. Finish: Chrome plated.

7. Maximum Flow Rate: 2.2 gpm (8.3 L/min.).
8. Handle(s): Wrist blade, 4 inches (102 mm).
9. Mounting Type: Back/wall, exposed.
10. Spout Type: Rigid, solid brass with wall brace.
11. Vacuum Breaker: Required for hose outlet.
12. Spout Outlet: Hose thread according to ASME B1.20.7.

2.3 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.

B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sinks level and plumb according to roughing-in drawings.

B. Set floor-mounted sinks in leveling bed of cement grout.

C. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

D. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079210 "Joint Sealants."

3.3 CONNECTIONS

A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.

B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed sinks and fittings.

D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 224216.16

SECTION 22 47 16

PRESSURE WATER COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes pressure water coolers and related components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filter Cartridges: Equal to 10 percent of quantity installed for each type and size indicated, but no fewer than 2 of each.

PART 2 - PRODUCTS

2.1 PRESSURE WATER COOLERS

A. Pressure Water Coolers EWC-1: Wall mounted, wheelchair accessible, bottle filler.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Elkay Manufacturing Co. LZWS-LRPBM28K
    b. Haws Corporation.
    c. Murdoch.

2. Standards:

    a. Comply with NSF 61 and NSF 372.
    b. Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.
    c. Comply with ICC A117.1.

3. Cabinet: Bi-level with two attached cabinets, all stainless steel.
4. Bubbler: One, with adjustable stream regulator, located on each cabinet deck.
5. Control: Push button.
6. Bottle Filler: Sensor activation with 20-second automatic shutoff timer. Fill rate 0.5 to 1.5 gpm (0.03155 to 0.09464 L/s).
7. Drain: Grid with NPS 1-1/4 (DN 32) tailpiece.
8. Supply: NPS 3/8 (DN 10) with shutoff valve.
9. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 (DN 32) brass P-trap.
10. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.
11. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

    a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

12. Capacities and Characteristics:

    a. Cooled Water: 8 gph (0.0084 L/s).
    b. Ambient-Air Temperature: 90 deg F (32 deg C).
    c. Inlet-Water Temperature: 80 deg F (27 deg C).
    d. Cooled-Water Temperature: 50 deg F (10 deg C).
    e. Electrical Characteristics:

        1) Motor Horsepower: 1/5.
        2) Volts: 120-V ac.
        3) Phase: Single.
        4) Hertz: 60.

13. Support: Type I Water Cooler Carrier.
14. Water Cooler Mounting Height: Handicapped/elderly according to ICC A117.1.

2.2 SUPPORTS

A. Type I Water Cooler Carrier:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Jay R. Smith Mfg. Co.
b. MIFAB, Inc.
c. Zurn Industries, LLC.

2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.

C. Install mounting frames, affixed to building construction, and attach recessed, pressure water coolers, and in-wall bottle filling stations to mounting frames.

D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball or gate valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping."

E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Install ball or gate shutoff valve on water supply to each fixture. Install valve upstream from filter for water cooler. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust pressure water-cooler temperature settings.

3.5 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224716

SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes basic requirements for factory-installed motors.

B. Related sections include the following:

1. Division 01 Sustainable Design Requirements – LEED Sections.

1.3 DEFINITIONS

A. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.

B. Field-Installed Motor: A motor installed at Project site and not factory installed as an integral component of motorized equipment.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Source Limitations: Obtain field-installed motors through one source from a single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices and features that comply with the following:

1. Compatible with the following:

a. Magnetic controllers.
b. Multi-speed controllers.
c. Reduced-voltage controllers.

2. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
3. Matched to torque and horsepower requirements of the load.
4. Matched to ratings and characteristics of supply circuit and required control sequence.

B. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.

C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 MOTOR REQUIREMENTS

A. Motor requirements apply to factory-and field-installed motors except as follows:

1. Different ratings, performance, or characteristics for motor are specified in another Section.
2. Motorized-equipment manufacturer requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.2 MOTOR CHARACTERISTICS

A. Motors larger than 1/2 HP: Three phase.

B. Motors Smaller Than 1/2 HP: Single phase.

C. Frequency Rating: 60 Hz.

D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.

E. Service Factor: 1.15 for open drip-proof motors; 1.0 for totally enclosed motors.

F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.

G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

H. Enclosure: Open drip-proof or totally enclosed.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium, as defined in NEMA MG 1.

C. Stator: Copper windings, unless otherwise indicated.

1. Multi-speed motors shall have separate winding for each speed.

D. Rotor: Squirrel cage, unless otherwise indicated.

E. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.

F. Temperature Rise: Match insulation rating, unless otherwise indicated.

G. Insulation: Class F, unless otherwise indicated.

H. Code Letter Designation:

1. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.

I. Enclosure: Rolled steel for motors smaller than 7.5 hp.

1. Finish: Gray enamel.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Designed with critical vibration frequencies outside operating range of controller output.
2. Temperature Rise: Matched to rating for Class B insulation.
3. Insulation: Class H.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

A. Type: One of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split-phase start, capacitor run.
3. Capacitor start, capacitor run.

B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.

C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for conduit systems to verify actual locations of conduit connections before motor installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

END OF SECTION 230513

SECTION 23 05 17

SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 SUBMITTALS

A. General Emissions Evaluation for all adhesives, sealants, paints, and coatings wet-applied on site, as well as flooring and insulation (ceiling, wall, thermal, and acoustic):

1. Submit product certification verifying the product has been tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010 using the applicable exposure scenario.

a. The default scenario is the private office scenario.
b. Certification must state the exposure scenario used to determine compliance.
c. Wet-applied products must state the amount applied in mass per surface area.
d. Certification must state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1:

1) 0.5 mg/m3 or less;
2) Between 0.5 and 5.0 mg/m3; or
3) 5.0 mg/m3 or more

B. VOC Content Requirements for wet-applied paints and coatings:

1. Submit product information verifying the product meets the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

    a. Methylene chloride and perchloroethylene may not be intentionally added.

C. VOC Content Requirements for wet-applied adhesives and sealants:

1. Submit product information verifying the product meets the applicable chemical content requirements of South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1, 2005.

    a. Products shall be analyzed by the methods specified in Rule #1168.
    b. The provisions of SCAQMD Rule #1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.
    c. Methylene chloride and perchloroethylene may not be intentionally added.

D. Composite Wood Evaluation

1. Submit product information verifying that composite wood, as defined by the California Air Resources Board (CARB), Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, is documented to have low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

    a. Salvaged and reused architectural millwork more than one year old at the time of occupancy is considered compliant, provided it meets the requirements for any site-applied paints, coatings, adhesives, and sealants.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Smith, Jay R. Mfg. Co.
2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. CALPICO, Inc.
2. Metraflex Company (The).
3. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Presealed Systems.

B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.6 PRODUCTS

A. Interior Paints & Coatings: For field applications, paints and coatings shall comply with VOC content requirements set by California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011. Products shall also comply with California Department of Public Health (CDPH) Standard Method v1.1-2010.

B. Interior Adhesives & Sealants: For field applications, adhesives and sealants shall comply with VOC content requirements set by South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1, 2005. Products shall also comply with California Department of Public Health (CDPH) Standard Method v1.1-2010.

C. Flooring: Products shall comply with California Department of Public Health (CDPH) Standard Method v1.1-2010.

D. Composite Wood: Products shall have with low formaldehyde emissions that meet the CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

E. Ceilings, Walls, Thermal, & Acoustic Insulation: Products shall comply with California Department of Public Health (CDPH) Standard Method v1.1-2010.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.
    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

A. Install stack-sleeve fittings in new slabs as slabs are constructed.

1. Install fittings that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
3. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level.
4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
5. Using grout, seal the space around outside of stack-sleeve fittings.

B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration,

assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

   a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves.

2. Exterior Concrete Walls below Grade:

   a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

   b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:

   a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

   b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.

1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

4. Concrete Slabs above Grade:

   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves.

5. Interior Partitions:

   a. Piping Smaller Than NPS 6 (DN 150): PVC-pipe sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 230517

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following hangers and supports for mechanical system piping and equipment:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Pipe positioning systems.
8. Equipment supports.

B. Related Sections include the following:

1. Division 01 Sustainable Design Requirements – LEED Sections.
2. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
3. Division 21 Section "Wet-Pipe Sprinkler Systems" for pipe hangers for fire-protection piping.
4. Division 23 Section "Vibration and Seismic Controls for HAVC Piping and Equipment" for vibration isolation devices.
5. Division 23 Section "Expansion Fittings and Loops for HVAC Piping" for pipe guides and anchors.
6. Division 23 Section "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Thermal-hanger shield inserts.
3. Powder-actuated fastener systems.
4. Pipe positioning systems.

B. LEED Submittals: Provide cost data breakdown, recycle content and manufacturer name and location.

C. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Pipe stands. Include Product Data for components.
4. Equipment supports.

D. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

E. Welding Certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel.".

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.
3. Grinnell Corp.
4. National Pipe Hanger Corporation.
5. PHD Manufacturing, Inc.
6. PHS Industries, Inc.
7. Piping Technology and Products, Inc.
8. Tolco, Inc.

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. Power-Strut Div.; Tyco International, Ltd.
4. Unistrut Corp.; Tyco International, Ltd.
5. Thomas & Betts Corporation
6. Tolco, Inc.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. ERICO/Michigan Hanger Co.
2. Pipe Shields, Inc.
3. Rilco Manufacturing Company, Inc.

C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.

E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. Hilti, Inc.
b. ITW Ramset/Red Head.
c. Masterset Fastening Systems, Inc.

B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated or stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Hilti, Inc.
c. ITW Ramset/Red Head.

2.7 PIPE STAND FABRICATION

A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

1. Manufacturers:

a. ERICO/Michigan Hanger Co.
b. MIRO Industries.

C. Low-Type, Single-Pipe Stand: One-piece plastic base unit with plastic roller, for roof installation without membrane penetration.

1. Manufacturers:

a. MIRO Industries.

D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.

1. Manufacturers:

a. ERICO/Michigan Hanger Co.
b. MIRO Industries.
c. Portable Pipe Hangers.

2. Base: Plastic.
3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.

1. Manufacturers:

a. Portable Pipe Hangers.

2. Bases: One or more plastic.
3. Vertical Members: Two or more protective-coated-steel channels.
4. Horizontal Member: Protective-coated-steel channel.
5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.

F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

2.8 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

B. Manufacturers:

1. C & S Mfg. Corp.
2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.

2.9 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.10 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
6. Adjustable Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
9. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.

21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.2 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Sections for roof accessories and curbs.

G. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Sections for plumbing fixtures.

H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

K. Install lateral bracing with pipe hangers and supports to prevent swaying.

L. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

M. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

N. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

O. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    b. NPS 4: 12 inches long and 0.06 inch thick.
    c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.

7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 230529

SECTION 23 05 48

VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Elastomeric isolation pads.
2. Elastomeric isolation mounts.
3. Restrained elastomeric isolation mounts.
4. Housed-spring isolators.
5. Restrained-spring isolators.
6. Housed-restrained-spring isolators.
7. Elastomeric hangers.
8. Spring hangers.
9. Snubbers.
10. Restraint channel bracings.
11. Restraint cables.
12. Seismic-restraint accessories.
13. Mechanical anchor bolts.
14. Adhesive anchor bolts.
15. Vibration isolation equipment bases.
16. Restrained isolation roof-curb rails.

B. Related Requirements:

1. Section 220548 "Vibration and Seismic Controls for Plumbing" for devices for plumbing equipment and systems.

1.3 DEFINITIONS

A. IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.

    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES, or an agency acceptable to authorities having jurisdiction.
    b. Annotate to indicate application of each product submitted and compliance with requirements.

3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: A, B, C, D, E or F.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II.

    a. Component Importance Factor: 1.5.
    b. Component Response Modification Factor: 3.5.
    c. Component Amplification Factor: 2.5.

3. Design Spectral Response Acceleration at Short Periods (0.2 Second).
4. Design Spectral Response Acceleration at 1.0-Second Period.
5. Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES, or an agency acceptable to authorities having jurisdiction.

    a. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they are subjected.

2.2 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.

2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
3. Size: Factory or field cut to match requirements of supported equipment.

4. Pad Material: Oil and water resistant with elastomeric properties.
5. Surface Pattern: Smooth, Ribbed or Waffle pattern.
6. Infused nonwoven cotton or synthetic fibers.
7. Load-bearing metal plates adhered to pads.
8. Sandwich-Core Material: Resilient and elastomeric.

    a. Surface Pattern: Waffle pattern.
    b. Infused nonwoven cotton or synthetic fibers.

2.3 ELASTOMERIC ISOLATION MOUNTS

A. Double-Deflection, Elastomeric Isolation Mounts:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.

2. Mounting Plates:

    a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
    b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.

3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.4 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

A. Restrained Elastomeric Isolation Mounts:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.
    d. Vibration Mountings & Controls, Inc.

2. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.

    a. Housing: Cast-ductile iron or welded steel.
    b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.5 HOUSED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.

2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.

    a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
    b. Top housing with attachment and leveling bolt, threaded mounting holes and internal leveling device or elastomeric pad.

2.6 RESTRAINED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.

2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.

    a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
    b. Top plate with threaded mounting holes or elastomeric pad.
    c. Internal leveling bolt that acts as blocking during installation.

3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
6. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.7 HOUSED-RESTRAINED-SPRING ISOLATORS

A. Freestanding, Steel, Open-Spring Isolators with Vertical-Limit Stop Restraint in Two-Part Telescoping Housing:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. California Dynamics Corporation.
   b. Kinetics Noise Control, Inc.
   c. Mason Industries, Inc.

2. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with adjustable snubbers to limit vertical movement.

   a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig (3447 kPa).
   b. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.

3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.8 ELASTOMERIC HANGERS

A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. California Dynamics Corporation.
   b. Kinetics Noise Control, Inc.
   c. Mason Industries, Inc.

2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
3. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

2.9 SPRING HANGERS

A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. California Dynamics Corporation.
    b. Kinetics Noise Control, Inc.
    c. Mason Industries, Inc.

2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

2.10 SNUBBERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Kinetics Noise Control, Inc.
2. Mason Industries, Inc.
3. Vibration Mountings & Controls, Inc.

B. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.

1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
3. Maximum 1/4-inch (6-mm) air gap, and minimum 1/4-inch- (6-mm-) thick resilient cushion.

2.11 RESTRAINT CHANNEL BRACINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cooper B-Line, Inc.
2. Hilti, Inc.
3. Mason Industries, Inc.
4. Unistrut.

B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.12 RESTRAINT CABLES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Kinetics Noise Control, Inc.
2. Loos & Co., Inc.
3. Vibration Mountings & Controls, Inc.

B. Restraint Cables: ASTM A 603 galvanized or ASTM A 492 stainless-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.13 SEISMIC-RESTRAINT ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cooper B-Line, Inc.
2. Kinetics Noise Control, Inc.
3. Mason Industries, Inc.
4. TOLCO.

B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or Reinforcing steel angle clamped to hanger rod.

C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.

D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.14 MECHANICAL ANCHOR BOLTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cooper B-Line, Inc.
2. Hilti, Inc.
3. Kinetics Noise Control, Inc.
4. Mason Industries, Inc.

B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.15 ADHESIVE ANCHOR BOLTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Hilti, Inc.
2. Kinetics Noise Control, Inc.
3. Mason Industries, Inc.

B. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.16 RESTRAINED ISOLATION ROOF-CURB RAILS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. California Dynamics Corporation.
2. Kinetics Noise Control.
3. Mason Industries, Inc.

B. Description: Factory-assembled, fully enclosed, insulated, air- and watertight curb rail designed to resiliently support equipment and to withstand seismic and wind forces.

C. Upper Frame: The upper frame shall provide continuous support for equipment and shall be captive to resiliently resist seismic and wind forces.

D. Lower Support Assembly: The lower support assembly shall be formed sheet metal section containing adjustable and removable steel springs that support the upper frame. The lower

support assembly shall have a means for attaching to building structure and a wood nailer for attaching roof materials, and shall be insulated with a minimum of 2 inches (50 mm) of rigid, glass-fiber insulation on inside of assembly. Adjustable, restrained-spring isolators shall be mounted on elastomeric vibration isolation pads and shall have access ports, for level adjustment, with removable waterproof covers at all isolator locations. Isolators shall be located so they are accessible for adjustment at any time during the life of the installation without interfering with the integrity of the roof.

E. Snubber Bushings: All-directional, elastomeric snubber bushings at least 1/4 inch (6 mm) thick.

F. Water Seal: Galvanized sheet metal with EPDM seals at corners, attached to upper support frame, extending down past wood nailer of lower support assembly, and counterflashed over roof materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic- and wind-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES, or an agency acceptable to authorities having jurisdiction.

B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

C. Comply with requirements in Section 077200 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.

D. Equipment Restraints:

1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction that provides required submittals for component.

E. Install cables so they do not bend across edges of adjacent equipment or building structure.

F. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES, or an agency acceptable to authorities having jurisdiction that provides required submittals for component.

G. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

J. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION 230548

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Duct labels.
4. Stencils.
5. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch (0.8-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws .
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules).

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: Yellow.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws .

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: White.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm)high.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches (32 mm) for ducts; and minimum letter height of 3/4 inch (19 mm) for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Fiberboard or metal.

2. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches (100 by 178 mm).
2. Fasteners: Brass grommet and wire or Reinforced grommet and wire or string.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 DUCT LABEL INSTALLATION

A. Install plastic-laminated or self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch (25 mm) high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet (15 m) in each space where ducts are exposed or concealed by removable ceiling system.

3.4 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.

B. TAB Conference: Meet with Commissioning Authority on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As required by AABC or NEBB.

1.5 PROJECT CONDITIONS

A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.6 COORDINATION

A. Notice: Provide 24 hour advance notice prior to commencement of TAB. Include scheduled test date.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

A. Subject to compliance with requirements, engage an available TAB Contractor that is a member of AABC or NEBB.

3.2 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Isolating and balancing valves are open and control valves are operational.
6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

C. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

D. Check dampers for proper position to achieve desired airflow path.

E. Check for airflow blockages.

F. Check condensate drains for proper connections and functioning.

G. Check for proper sealing of air-handling-unit components.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.

c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

a. Report the cleanliness status of filters and the time static pressures are measured.

4. Review Record Documents to determine variations in design static pressures versus actual static pressures.
5. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Nameplate and measured voltage, each phase.
5. Nameplate and measured amperage, each phase.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation.

3.8 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

3.9 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 to Plus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

3.10 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced.

3.11 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.

2. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Report date.
6. Signature of TAB supervisor who certifies the report.
7. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
8. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.

9. Nomenclature sheets for each item of equipment.
10. Data for terminal units, including, type and size.
11. Notes to explain why certain final data in the body of reports vary from indicated values.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches , and bore.
    i. Number, make, and size of belts.
    j. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.

b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches , and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm .
b. Total system static pressure in inches wg .
c. Fan rpm.
d. Discharge static pressure in inches wg .
e. Filter static-pressure differential in inches wg .
f. Preheat-coil static-pressure differential in inches wg .
g. Cooling-coil static-pressure differential in inches wg .
h. Heating-coil static-pressure differential in inches wg .
i. Outdoor airflow in cfm .
j. Return airflow in cfm .
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).
h. Tube size in NPS (DN).
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm .
b. Average face velocity in fpm .
c. Air pressure drop in inches wg .
d. Outdoor-air, wet- and dry-bulb temperatures in deg F .
e. Return-air, wet- and dry-bulb temperatures in deg F .
f. Entering-air, wet- and dry-bulb temperatures in deg F .
g. Leaving-air, wet- and dry-bulb temperatures in deg F .

G. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches , and bore.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches , and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm .
b. Total system static pressure in inches wg .
c. Fan rpm.
d. Discharge static pressure in inches wg .
e. Suction static pressure in inches wg .

H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F .
d. Duct static pressure in inches wg .
e. Duct size in inches .
f. Duct area in sq. ft. .
g. Indicated air flow rate in cfm .
h. Indicated velocity in fpm .
i. Actual air flow rate in cfm .
j. Actual average velocity in fpm .

I. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.

f. Number from system diagram.
g. Type and model number.
h. Size.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm .
b. Air velocity in fpm .
c. Final air flow rate in cfm .
d. Space temperature in deg F .

J. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

a. System and air-handling-unit identification.
b. Location and zone.
c. Room or riser served.
d. Flowmeter type.

K. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of calibration.

END OF SECTION 230593

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Outdoor, exposed supply and return.

B. Related Sections:

1. Section 233113 "Metal Ducts" for duct liners.
2. 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS for additional LEED (Leadership in Energy & Environmental Design) requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For adhesives and sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
3. Provide product certificates or other back-up documentation for any product meeting the following LEED credits. Also include material costs, excluding cost of installation, for all materials.

a. Environmental Product Declarations
b. Multi-Attribute Optimization
c. Raw Material Source and Extraction Reporting
d. Leadership Extraction Practices

e. Material Ingredient Reporting
f. Material Ingredient Optimization

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Sheet, K-Flex Gray Duct Liner, and K-FLEX LS.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I; Type II with factory-applied vinyl jacket; Type III with factory-applied FSK jacket; or Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Owens Corning; SOFTR All-Service Duct Wrap.

H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation without factory-applied jacket, with factory-applied ASJ or with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; Commercial Board.
b. Johns Manville; 800 Series Spin-Glas.
c. Knauf Insulation; Insulation Board.
d. Owens Corning; Fiberglas 700 Series.

I. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ or FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. (40 kg/cu. m) or more. Thermal conductivity (k-value) at 100 deg F (55 deg C) is 0.29 Btu x in./h x sq. ft. x deg F (0.042 W/m x K) or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. CertainTeed Corp.; CrimpWrap.
    b. Johns Manville; MicroFlex.
    c. Knauf Insulation; Pipe and Tank Insulation.
    d. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Aeroflex USA, Inc.; Aeroseal.
    b. Armacell LLC; Armaflex 520 Adhesive.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
    b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
b. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.

3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
   b. Eagle Bridges - Marathon Industries; 501.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
   d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm (0.03 metric perm) at 35-mil (0.9-mm) dry film thickness.
3. Service Temperature Range: 0 to 180 deg F (Minus 18 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following :

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
   b. Eagle Bridges - Marathon Industries; 570.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm (0.033 metric perm) at 30-mil (0.8-mm) dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F (Minus 46 to plus 104 deg C).
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
   b. Eagle Bridges - Marathon Industries; 550.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms (1.2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: 60 percent by volume and 66 percent by weight.

5. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
   b. Vimasco Corporation; 713 and 714.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
4. Service Temperature Range: 0 to plus 180 deg F (Minus 18 to plus 82 deg C).
5. Color: White.

2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following :

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.Eagle Bridges - Marathon Industries; 405.
   b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
   c. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms (0.86 metric perm) when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, provide one of the following :

a. Johns Manville; Zeston.
b. P.I.C. Plastics, Inc.; FG Series.
c. Proto Corporation; LoSmoke.
d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White or color-code jackets based on system. Color as selected by Architect.

D. Metal Jacket:

1. Products: Subject to compliance with requirements, provide the following provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
    b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
    c. RPR Products, Inc.; Insul-Mate.

2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.

    a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
    b. Finish and thickness are indicated in field-applied jacket schedules.
    c. Moisture Barrier for Indoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
    d. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.

3. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.

    a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
    b. Material, finish, and thickness are indicated in field-applied jacket schedules.
    c. Moisture Barrier for Indoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
    d. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.

E. Self-Adhesive Outdoor Jacket: 60-mil- (1.5-mm-) thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white or stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Polyguard Products, Inc.; Alumaguard 60.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches (75 mm).
3. Thickness: 11.5 mils (0.29 mm).

4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ABI, Ideal Tape Division; 491 AWF FSK.
   b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
   c. Compac Corporation; 110 and 111.
   d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches (75 mm).
3. Thickness: 6.5 mils (0.16 mm).
4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ABI, Ideal Tape Division; 370 White PVC tape.
   b. Compac Corporation; 130.
   c. Venture Tape; 1506 CW NS.

2. Width: 2 inches (50 mm).
3. Thickness: 6 mils (0.15 mm).
4. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ABI, Ideal Tape Division; 488 AWF.
   b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   c. Compac Corporation; 120.
   d. Venture Tape; 3520 CW.

2. Width: 2 inches (50 mm).
3. Thickness: 3.7 mils (0.093 mm).
4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

2.9 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide one of the following:

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch (0.38 mm) thick, 1/2 inch (13 mm) wide with wing seal or closed seal.
3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 1/2 inch (13 mm) wide with wing seal or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; CWP-1.
2) GEMCO; CD.
3) Midwest Fasteners, Inc.; CD.
4) Nelson Stud Welding; TPA, TPC, and TPS.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.

a. Products: Subject to compliance with requirements, provide the following provide one of the following:

1) AGM Industries, Inc.; CHP-1.
2) GEMCO; Cupped Head Weld Pin.
3) Midwest Fasteners, Inc.; Cupped Head.
4) Nelson Stud Welding; CHP.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.

2) GEMCO; Perforated Base.
3) Midwest Fasteners, Inc.; Spindle.

b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
c. Spindle: Copper- or zinc-coated, low-carbon steel, aluminum or stainless steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, galvanized-steel, aluminum or stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than in diameter.

a. Products: Subject to compliance with requirements, provide one of the following:

1) AGM Industries, Inc.; RC-150.
2) GEMCO; R-150.
3) Midwest Fasteners, Inc.; WA-150.
4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than in diameter.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) GEMCO.
2) Midwest Fasteners, Inc.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

D. Wire: 0.080-inch (2.0-mm) nickel-copper alloy, 0.062-inch (1.6-mm) soft-annealed, stainless steel, 0.062-inch (1.6-mm) soft-annealed, galvanized steel.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. C & F Wire.

2.10 CORNER ANGLES

A. PVC Corner Angles: 30 mils (0.8 mm) thick, minimum 1 by 1 inch (25 by 25 mm), PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

B. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14.

C. Stainless-Steel Corner Angles: 0.024 inch (0.61 mm) thick, minimum 1 by 1 inch (25 by 25 mm), stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316.

2.11 LEED MATERIAL REQUIREMENTS

A. Environmental Product Declarations

B. Multi-Attribute Optimization

C. Raw Material Source and Extraction Reporting

D. Leadership Extraction Practices

E. Material Ingredient Reporting

F. Material Ingredient Optimization

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches (50 mm).
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic

applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.8 FINISHES

A. Insulation with ASJ, , or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099000 “Painting”.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.9 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, round and flat-oval, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

B. Concealed, round and flat-oval, return-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick .75-lb/cu. ft. nominal density.

C. Concealed, round and flat-oval, outdoor-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

D. Concealed, rectangular, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

E. Concealed, rectangular, return-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

F. Concealed, rectangular, outdoor-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

G. Concealed, supply-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

H. Concealed, return-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

I. Concealed, outdoor-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1 1/2 inches thick and .75-lb/cu. ft. nominal density.

J. Exposed, round and flat-oval, supply-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

K. Exposed, round and flat-oval, return-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

L. Exposed, round and flat-oval, outdoor-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

M. Exposed, rectangular, supply-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

N. Exposed, rectangular, return-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

O. Exposed, rectangular, outdoor-air duct insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

P. Exposed, supply-air plenum insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

Q. Exposed, return-air plenum insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

R. Exposed, outdoor-air plenum insulation shall be one of the following:

1. 1” duct liner (See specification 233113 Metal Ducts for requirements).

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:

1. Foil & Paper.

D. Ducts and Plenums, Exposed:

1. Foil & Paper.

3.12 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

3.13 LEED CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management: Construction Waste shall be managed in accordance with provisions of Section 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Documentation shall be submitted to satisfy the requirements of that section.

END OF SECTION 230713

SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following HVAC piping systems:

1. Condensate drain piping, indoors and outdoors.
2. Chilled-water piping, indoors and outdoors.
3. Refrigerant suction and hot-gas piping, indoors and outdoors.

B. Related Sections:

1. Section 230713 "Duct Insulation."
2. 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS for additional LEED (Leadership in Energy & Environmental Design) requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit IEQ 4: For adhesives and sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
3. Provide product certificates or other back-up documentation for any product meeting the following LEED credits. Also include material costs, excluding cost of installation, for all materials.

a. Environmental Product Declarations
b. Multi-Attribute Optimization
c. Raw Material Source and Extraction Reporting
d. Leadership Extraction Practices
e. Material Ingredient Reporting

f. Material Ingredient Optimization

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Calcium Silicate:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Industrial Insulation Group (IIG); Thermo-12 Gold.

2. Preformed Pipe Sections: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
3. Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
4. Prefabricated Fitting Covers: Comply with ASTM C 450 and ASTM C 585 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

G. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pittsburgh Corning Corporation; Foamglas.

2. Block Insulation: ASTM C 552, Type I.
3. Special-Shaped Insulation: ASTM C 552, Type III.
4. Board Insulation: ASTM C 552, Type IV.
5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
6. Preformed Pipe Insulation with Factory-Applied ASJ ASJ-SSL: Comply with ASTM C 552, Type II, Class 2.
7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.

H. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

I. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I, or II with factory-applied vinyl jacket, III with factory-applied FSK jacket or III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All-Service Duct Wrap.

J. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:
a. Johns Manville; Micro-Lok.
b. Knauf Insulation; 1000-Degree Pipe Insulation.
c. Manson Insulation Inc.; Alley-K.
d. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, without factory-applied jacket, with factory-applied ASJ or with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
3. Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, without factory-applied jacket, with factory-applied ASJ or with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

K. Mineral-Fiber, Pipe Insulation Wicking System: Preformed pipe insulation complying with ASTM C 547, Type I, Grade A, with absorbent cloth factory-applied to the entire inside surface

of preformed pipe insulation and extended through the longitudinal joint to outside surface of insulation under insulation jacket. Factory apply a white, polymer, vapor-retarder jacket with self-sealing adhesive tape seam and evaporation holes running continuously along the longitudinal seam, exposing the absorbent cloth.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Knauf Insulation; Permawick Pipe Insulation.
    b. Owens Corning; VaporWick Pipe Insulation.

L. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ or FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. CertainTeed Corp.; CrimpWrap.
    b. Johns Manville; MicroFlex.
    c. Knauf Insulation; Pipe and Tank Insulation.
    d. Manson Insulation Inc.; AK Flex.
    e. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ramco Insulation, Inc.; Super-Stik.

B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ramco Insulation, Inc.; Thermokote V.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-97.
b. Eagle Bridges - Marathon Industries; 290.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-27.
d. Mon-Eco Industries, Inc.; 22-30.
e. Vimasco Corporation; 760.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-84.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
   b. Eagle Bridges - Marathon Industries; 225.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
   d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
   b. Eagle Bridges - Marathon Industries; 225.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
   d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

G. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Dow Corning Corporation; 739, Dow Silicone.
   b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
   c. P.I.C. Plastics, Inc.; Welding Adhesive.
   d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
   b. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
   b. Eagle Bridges - Marathon Industries; 501.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
   d. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
   b. Eagle Bridges - Marathon Industries; 570.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
b. Eagle Bridges - Marathon Industries; 550.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
d. Mon-Eco Industries, Inc.; 55-50.
e. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
c. Vimasco Corporation; 713 and 714.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.6 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass, Phenolic, and Polyisocyanurate Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
    d. Mon-Eco Industries, Inc.; 44-05.
    e. Pittsburgh Corning Corporation; Pittseal 444.

2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-70.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
    d. Mon-Eco Industries, Inc.; 44-05.

3. Materials shall be compatible with insulation materials, jackets, and substrates.
4. Permanently flexible, elastomeric sealant.
5. Service Temperature Range: Minus 100 to plus 300 deg F.
6. Color: White or gray.
7. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
8. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
    d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perm when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

6. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perm when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

7. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

8. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Chil-Glas Number 10.

B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
b. Vimasco Corporation; Elastafab 894.

2.9 FIELD-APPLIED CLOTHS

A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..

1. Products: Subject to compliance with requirements, provide one of the following:

a. Alpha Associates, Inc.; Alpha-Maritex 84215 and 84217/9485RW, Luben 59.

2.10 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Johns Manville; Zeston.
   b. P.I.C. Plastics, Inc.; FG Series.
   c. Proto Corporation; LoSmoke.
   d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.
3. Color: Color as selected by Architect.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

   a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

D. Metal Jacket:

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
   b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
   c. RPR Products, Inc.; Insul-Mate.

2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

   a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
   b. Finish and thickness are indicated in field-applied jacket schedules.
   c. Moisture Barrier for Indoor Applications: 2.5-mil- thick polysurlyn.
   d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
   e. Factory-Fabricated Fitting Covers:

      1) Same material, finish, and thickness as jacket.
      2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      3) Tee covers.
      4) Flange and union covers.
      5) End caps.
      6) Beveled collars.
      7) Valve covers.
      8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

3. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.

a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
b. Material, finish, and thickness are indicated in field-applied jacket schedules.
c. Moisture Barrier for Indoor Applications: 2.5-mil- thick polysurlyn.
d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
e. Factory-Fabricated Fitting Covers:

1) Same material, finish, and thickness as jacket.
2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
3) Tee covers.
4) Flange and union covers.
5) End caps.
6) Beveled collars.
7) Valve covers.
8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

E. Underground Direct-Buried Jacket: 125-mil- thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Pittsburgh Corning Corporation; Pittwrap.
b. Polyguard Products, Inc.; Insulrap No Torch 125.

F. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white or stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Polyguard Products, Inc.; Alumaguard 60.

G. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Chemical Company (The); Saran 540 Vapor Retarder Film.

H. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Dow Chemical Company (The); Saran 560 Vapor Retarder Film.

I. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.11 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. ABI, Ideal Tape Division; 491 AWF FSK.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    c. Compac Corporation; 110 and 111.
    d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 488 AWF.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
c. Compac Corporation; 120.
d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

E. PVDC Tape for Indoor Applications: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.

2. Width: 3 inches.
3. Film Thickness: 4 mils.
4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

F. PVDC Tape for Outdoor Applications: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Chemical Company (The); Saran 560 Vapor Retarder Tape.

2. Width: 3 inches.
3. Film Thickness: 6 mils.

4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

2.12 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide one of the following:

   a. ITW Insulation Systems; Gerrard Strapping and Seals.
   b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 3/4 inch wide with wing seal or closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

C. Wire: 0.080-inch nickel-copper alloy, 0.062-inch soft-annealed, stainless steel or 0.062-inch soft-annealed, galvanized steel.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. C & F Wire.

2.13 LEED MATERIAL REQUIREMENTS

A. Environmental Product Declarations

B. Multi-Attribute Optimization

C. Raw Material Source and Extraction Reporting

D. Leadership Extraction Practices

E. Material Ingredient Reporting

F. Material Ingredient Optimization

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF CALCIUM SILICATE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
2. Install two-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.
3. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch. Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.
4. Finish flange insulation same as pipe insulation.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.

2. When preformed insulation sections of insulation are not available, install mitered sections of calcium silicate insulation. Secure insulation materials with wire or bands.
3. Finish fittings insulation same as pipe insulation.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install mitered segments of calcium silicate insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
2. Install insulation to flanges as specified for flange insulation application.
3. Finish valve and specialty insulation same as pipe insulation.

3.7 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.8 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.9 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.10 INSTALLATION OF PHENOLIC INSULATION

A. General Installation Requirements:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with 0.062-inch wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.11 INSTALLATION OF POLYISOCYANURATE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with tape or bands and tighten without deforming insulation materials. Orient longitudinal joints between half sections in 3- and 9-o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch thickness.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyisocyanurate block insulation of same thickness as pipe insulation.

C. Insulation Installation on Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of polyisocyanurate insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.12 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.13 INSTALLATION OF POLYSTYRENE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation with tape or bands and tighten bands without deforming insulation materials. Orient longitudinal joints between half sections in 3- and 9-o'clock positions on the pipe.

2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, and make thickness same as adjacent pipe insulation, not to exceed 1-1/2-inch.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polystyrene block insulation of same thickness as pipe insulation.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed section of polystyrene insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.14 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

E. Where PVDC jackets are indicated, install as follows:

1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
2. Wrap factory-presized jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
3. Continuous jacket can be spiral-wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch- circumference limit allows for 2-inch- overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.15 FINISHES

A. Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.17 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.18 INDOOR PIPING INSULATION SCHEDULE

A. Condensate and Equipment Drain Water below 60 Deg F:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Cellular Glass: 1-1/2 inches thick.
b. Flexible Elastomeric: 1 inch thick.

B. Chilled Water:

1. NPS 10 and Smaller: Insulation shall be:

a. Cellular Glass: 2 inches thick.

2. NPS 12 and Larger: Insulation shall be:
a. Cellular Glass: 3 inches thick.

C. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Cellular Glass: 1-1/2 inches thick.
    b. Flexible Elastomeric: 1 inch thick.

D. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Flexible Elastomeric: 1 inch thick.
    b. Polyolefin: 1 inch thick.

3.19 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Chilled Water:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Cellular Glass: 3 inches thick.
    b. Flexible Elastomeric: 3 inches thick.
    c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 3 inches thick.
    d. Phenolic: 2 inches thick.
    e. Polyisocyanurate: 2 inches thick.
    f. Polyolefin: 3 inches thick.
    g. Polystyrene: 2 inches thick.

B. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Cellular Glass: 2 inches thick.
    b. Flexible Elastomeric: 2 inches thick.
    c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.
    d. Phenolic: 2 inches thick.
    e. Polyisocyanurate: 2 inches thick.
    f. Polyolefin: 2 inches thick.
    g. Polystyrene: 2 inches thick.

C. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Flexible Elastomeric: 2 inches thick.
    b. Polyolefin: 2 inches thick.

3.20 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:
   1. PVC, Color-Coded by System: 30 mils thick.
   2. Aluminum, Smooth, Corrugated or Stucco Embossed: 0.032 inch thick.
   3. Stainless Steel, Type 304 or Type 316, Smooth 2B Finish, Corrugated or Stucco Embossed: 0.024 inch thick.

D. Piping, Exposed:
   1. PVC, Color-Coded by System: 30 mils thick.
   2. Aluminum, Smooth, Corrugated or Stucco Embossed: 0.040 inch thick.
   3. Stainless Steel, Type 304 or Type 316, Smooth 2B Finish, Corrugated or Stucco Embossed: 0.024 inch thick.

3.21 LEED CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management: Construction Waste shall be managed in accordance with provisions of Section 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Documentation shall be submitted to satisfy the requirements of that section.

END OF SECTION 230719

SECTION 23 08 00

COMMISSIONING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The requirements of this Section apply to all sections of Division 23.

B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned is specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 13 GENERAL COMMISSIONING REQUIRMENTS. A Commissioning Agent/Provider/Specialist appointed by the Owner's Representative will manage the commissioning process.

1.2 RELATED WORK

A. Division 01 GENERAL REQUIREMENTS

B. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

1.3 SUMMARY

A. This Section includes requirements for commissioning the heating, ventilation, and air conditioning (HVAC) systems, related subsystems and related equipment. This Section supplements the general requirements specified in Section 01 91 13 General Commissioning Requirements.

B. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for more details regarding processes and procedures as well as roles and responsibilities for all Commissioning Team members.

1.4 DEFINITIONS

A. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for definitions.

1.5 COMMISSIONED SYSTEMS

A. Commissioning of a system or systems specified in Division 23 is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's Maintenance personnel in accordance with the requirements of Section 01 91 13 and of Division 23, is required in cooperation with the Owner and the Commissioning Agent.

B. The HVAC systems commissioning will include the systems listed in Section 01 91 13 General Commissioning Requirements:

1.6 SUBMITTALS

A. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION INSPECTIONS

A. Commissioning of HVAC systems will require inspection of individual elements of the HVAC systems construction throughout the construction period. The Contractor shall coordinate with the Commissioning Agent in accordance with Section 01 91 13 and the Commissioning plan to schedule HVAC systems inspections as required to support the Commissioning Process.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the Owner and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the type of equipment will be returned to the Contractor for correction and resubmission. Refer to SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

3.3 CONTRACTORS TESTS

A. Contractor tests as required by other sections of Division 23 shall be scheduled and documented in accordance with Division 01 GENERAL REQUIREMENTS. All testing shall be incorporated into the project schedule. Contractor shall provide no less than 7 calendar days' notice of testing. The Commissioning Agent will witness selected Contractor tests at the sole discretion of the Commissioning Agent. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

3.4 SYSTEMS FUNCTIONAL PERFORMANCE TESTING:

A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the Resident Engineer. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor and witnesses of the tests shall sign and date a testing attendance form to verify tests were performed. See Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

3.5 TRAINING OF OWNER'S PERSONNEL

A. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. Contractor shall submit training agendas, trainer resumes, and a training attendance form in accordance with the requirements of Section 01 91 13. These documents will be reviewed by the Commissioning Agent and included within the Final Commissioning Report. The instruction shall be scheduled in coordination with the Resident Engineer after submission and approval of formal training plans. Refer to Section 01 79 00 DEMONSTRATION AND TRAINING REQUIREMENTS, 01 91 13 GENERAL COMMISSIONING REQUIREMENTS and Division 23 Sections for additional Contractor training requirements.

SECTION 23 09 23

DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. DDC system for monitoring and controlling of HVAC systems.
2. Delivery of selected control devices to equipment and systems manufacturers for factory installation and to HVAC systems installers for field installation.

1.2 DEFINITIONS

A. Algorithm: A logical procedure for solving a recurrent mathematical problem. A prescribed set of well-defined rules or processes for solving a problem in a finite number of steps.

B. Analog: A continuously varying signal value, such as current, flow, pressure, or temperature.

C. Binary: Two-state signal where a high signal level represents ON" or "OPEN" condition and a low signal level represents "OFF" or "CLOSED" condition. "Digital" is sometimes used interchangeably with "Binary" to indicate a two-state signal.

D. Controller: Generic term for any standalone, microprocessor-based, digital controller residing on a network, used for local or global control. Three types of controllers are indicated: Network Controller, Programmable Application Controller, and Application-Specific Controller.

E. Control System Integrator: An entity that assists in expansion of existing enterprise system and support of additional operator interfaces to I/O being added to existing enterprise system.

F. COV: Changes of value.

G. DDC System Provider: Authorized representative of, and trained by, DDC system manufacturer and responsible for execution of DDC system Work indicated.

H. Distributed Control: Processing of system data is decentralized and control decisions are made at subsystem level. System operational programs and information are provided to remote subsystems and status is reported back. On loss of communication, subsystems shall be capable of operating in a standalone mode using the last best available data.

I. DOCSIS: Data-OverCable Service Interface Specifications.

J. Gateway: Bidirectional protocol translator that connects control systems that use different communication protocols.

K. HLC: Heavy load conditions.

L. I/O: System through which information is received and transmitted. I/O refers to analog input (AI), binary input (BI), analog output (AO) and binary output (BO). Analog signals are continuous and represent control influences such as flow, level, moisture, pressure, and temperature. Binary signals convert electronic signals to digital pulses (values) and generally represent two-position operating and alarm status. "Digital," (DI and (DO), is sometimes used interchangeably with "Binary," (BI) and (BO), respectively.

M. LAN: Local area network.

N. LNS: LonWorks Network Services.

O. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

P. Modbus TCP/IP: An open protocol for exchange of process data.

Q. MS/TP: Master-slave/token-passing, IEE 8802-3. Datalink protocol LAN option that uses twisted-pair wire for low-speed communication.

R. MTBF: Mean time between failures.

S. Network Controller: Digital controller, which supports a family of programmable application controllers and application-specific controllers, that communicates on peer-to-peer network for transmission of global data.

T. Network Repeater: Device that receives data packet from one network and rebroadcasts it to another network. No routing information is added to protocol.

U. Peer to Peer: Networking architecture that treats all network stations as equal partners.

V. POT: Portable operator's terminal.

W. PUE: Performance usage effectiveness.

X. RAM: Random access memory.

Y. RF: Radio frequency.

Z. Router: Device connecting two or more networks at network layer.

AA. Server: Computer used to maintain system configuration, historical and programming database.

BB. TCP/IP: Transport control protocol/Internet protocol incorporated into Microsoft Windows.

CC. UPS: Uninterruptible power supply.

DD. USB: Universal Serial Bus.

EE. User Datagram Protocol (UDP): This protocol assumes that the IP is used as the underlying protocol.

FF. WLED: White light emitting diode.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product include the following:

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Operating characteristics, electrical characteristics, and furnished accessories indicating process operating range, accuracy over range, control signal over range, default control signal with loss of power, calibration data specific to each unique application, electrical power requirements, and limitations of ambient operating environment, including temperature and humidity.
3. Product description with complete technical data, performance curves, and product specification sheets.
4. Installation, operation and maintenance instructions including factors effecting performance.
5. Bill of materials of indicating quantity, manufacturer, and extended model number for each unique product.
6. When manufacturer's product datasheets apply to a product series rather than a specific product model, clearly indicate and highlight only applicable information.
7. Each submitted piece of product literature shall clearly cross reference specification and drawings that submittal is to cover.

B. Software Submittal:

1. Cross-referenced listing of software to be loaded on each operator workstation, server, gateway, and DDC controller.
2. Description and technical data of all software provided, and cross-referenced to products in which software will be installed.
3. Operating system software, operator interface and programming software, color graphic software, DDC controller software, maintenance management software, and third-party software.
4. Include a flow diagram and an outline of each subroutine that indicates each program variable name and units of measure.
5. Listing and description of each engineering equation used with reference source.
6. Listing and description of each constant used in engineering equations and a reference source to prove origin of each constant.
7. Description of operator interface to alphanumeric and graphic programming.
8. Description of each network communication protocol.
9. Description of system database, including all data included in database, database capacity and limitations to expand database.
10. Description of each application program and device drivers to be generated, including specific information on data acquisition and control strategies showing their relationship to system timing, speed, processing burden and system throughout.
11. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.

C. Shop Drawings:

1. General Requirements:

   a. Include cover drawing with Project name, location, Owner, Architect, Contractor and issue date with each Shop Drawings submission.
   b. Include a drawing index sheet listing each drawing number and title that matches information in each title block.
   c. Prepare Drawings using CAD.

2. Include plans, elevations, sections, and mounting details where applicable.
3. Include details of product assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
4. Detail means of vibration isolation and show attachments to rotating equipment.
5. Plan Drawings indicating the following:

   a. Screened backgrounds of walls, structural grid lines, HVAC equipment, ductwork and piping.
   b. Room names and numbers with coordinated placement to avoid interference with control products indicated.
   c. Each desktop operator workstation, server, gateway, router, DDC controller, control panel instrument connecting to DDC controller, and damper and valve connecting to DDC controller, if included in Project.
   d. Exact placement of products in rooms, ducts, and piping to reflect proposed installed condition.
   e. Network communication cable and raceway routing.
   f. Proposed routing of wiring, cabling, conduit, and tubing, coordinated with building services for review before installation.

6. Schematic drawings for each controlled HVAC system indicating the following:

   a. I/O points labeled with point names shown. Indicate instrument range, normal operating set points, and alarm set points. Indicate fail position of each damper and valve, if included in Project.
   b. I/O listed in table format showing point name, type of device, manufacturer, model number, and cross-reference to product data sheet number.
   c. A graphic showing location of control I/O in proper relationship to HVAC system.
   d. Wiring diagram with each I/O point having a unique identification and indicating labels for all wiring terminals.
   e. Unique identification of each I/O that shall be consistently used between different drawings showing same point.
   f. Elementary wiring diagrams of controls for HVAC equipment motor circuits including interlocks, switches, relays and interface to DDC controllers.
   g. Narrative sequence of operation.
   h. Graphic sequence of operation, showing all inputs and output logical blocks.

7. Control panel drawings indicating the following:

   a. Panel dimensions, materials, size, and location of field cable, raceways, and tubing connections.

b. Interior subpanel layout, drawn to scale and showing all internal components, cabling and wiring raceways, nameplates and allocated spare space.
c. Front, rear, and side elevations and nameplate legend.
d. Unique drawing for each panel.

8. DDC system network riser diagram indicating the following:

a. Each device connected to network with unique identification for each.
b. Interconnection of each different network in DDC system.
c. For each network, indicate communication protocol, speed and physical means of interconnecting network devices, such as copper cable type, or fiber-optic cable type. Indicate raceway type and size for each.
d. Each network port for connection of an operator workstation or other type of operator interface with unique identification for each.

D. System Description:

1. Full description of DDC system architecture, network configuration, operator interfaces and peripherals, servers, controller types and applications, gateways, routers and other network devices, and power supplies.
2. Complete listing and description of each report, log and trend for format and timing and events which initiate generation.
3. System and product operation under each potential failure condition including, but not limited to, the following:

a. Loss of power.
b. Loss of network communication signal.
c. Loss of controller signals to inputs and outpoints.
d. Operator workstation failure.
e. Server failure.
f. Gateway failure.
g. Network failure
h. Controller failure.
i. Instrument failure.

4. Description of Owner training.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For DDC system to include in emergency, operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials and parts that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Include product manufacturers' recommended parts lists for proper product operation over four-year period following warranty period. Parts list shall be indicated for each year.

1.7 QUALITY ASSURANCE

A. DDC System Manufacturer Qualifications:

1. Nationally recognized manufacturer of DDC systems and products.
2. DDC systems with similar requirements to those indicated for a continuous period of five years within time of bid.
3. Having complete published catalog literature, installation, operation and maintenance manuals for all products intended for use.
4. Having full-time in-house employees for the following:

    a. Product research and development.
    b. Product and application engineering.
    c. Product manufacturing, testing and quality control.
    d. Technical support for DDC system installation training, commissioning and troubleshooting of installations.
    e. Owner operator training.

B. DDC System Provider Qualifications:

1. Authorized representative of, and trained by, DDC system manufacturer.
2. In-place facility located within county of Project.
3. Staffing resources of competent full-time employees that are assigned to execute work according to schedule.
4. Service and maintenance staff assigned to support Project during warranty period.
5. Product parts inventory to support on-going DDC system operation for a period of not less than 5 years after Substantial Completion.
6. DDC system manufacturer's backing to take over execution of Work if necessary to comply with requirements indicated. Include Project-specific written letter, signed by manufacturer's corporate officer, if requested.

C. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
4. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

E. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace products that fail in materials or workmanship within specified warranty period.

1. Failures shall be adjusted, repaired, or replaced at no additional cost or reduction in service to Owner.
2. Include updates or upgrades to software and firmware if necessary to resolve deficiencies.

    a. Install updates only after receiving Owner's written authorization.

3. Warranty service shall occur during normal business hours and commence within 24 hours of Owner's warranty service request.
4. Warranty Period: Two year(s) from date of Substantial Completion.

    a. For Gateway: Three year parts and labor warranty for each.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. KMC

B. Sun Belt

C. Or Approved Equal

2.2 DDC SYSTEM DESCRIPTION

A. Microprocessor-based monitoring and control including analog/digital conversion and program logic. A control loop or subsystem in which digital and analog information is received and processed by a microprocessor, and digital control signals are generated based on control algorithms and transmitted to field devices to achieve a set of predefined conditions.

    1. DDC system shall consist of peer-to-peer network of distributed DDC controllers, operator interfaces, and software.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design DDC system to satisfy requirements indicated.

B. Delegated Design: Engage a qualified professional to design DDC system to satisfy requirements indicated.

    1. System Performance Objectives:

        a. DDC system shall manage HVAC systems.

b. DDC system control shall operate HVAC systems to achieve optimum operating costs while using least possible energy and maintaining specified performance.
c. DDC system shall respond to power failures, HVAC equipment failures, and adverse and emergency conditions encountered through connected I/O points.
d. DDC system shall operate while unattended by an operator and through operator interaction.
e. DDC system shall record trends and transaction of events and produce report information such as performance, energy, occupancies, and equipment operation.

C. Surface-Burning Characteristics: Products installed in ducts, equipment, and return-air paths shall comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

D. Network Bandwidth: Design each network of DDC system to include at least 30 percent available spare bandwidth with DDC system operating under normal and heavy load conditions indicated. Calculate bandwidth usage, and apply a safety factor to ensure that requirement is satisfied when subjected to testing under worst case conditions.

E. Future Expandability:

1. DDC system size shall be expandable to an ultimate capacity of at least two times total I/O points indicated.
2. Additional DDC controllers, I/O and associated wiring shall be all that is needed to achieve ultimate capacity. Initial network infrastructure shall be designed and installed to support ultimate capacity.
3. Operator interfaces installed initially shall not require hardware and software additions and revisions for ultimate capacity.

F. Input Point Displayed Accuracy: Input point displayed values shall meet following end-to-end overall system accuracy, including errors associated with meter, sensor, transmitter, lead wire or cable, and analog to digital conversion.

1. Energy:

a. Thermal: Within 5 percent of reading.
b. Electric Power: per electrical meter which is by div. 26

2. Flow:

a. Air: Within 5 percent of design flow rate.

3. Moisture (Relative Humidity):

a. Air: Within 5 percent RH.
b. Space: Within 5 percent RH.
c. Outdoor: Within 5 percent RH.

4. Level: Within 5 percent of reading.

5. Pressure:

    a. Air, Ducts and Equipment: 1 percent of instrument range.
    b. Space: Within 1 percent of instrument range.

6. Speed: Within 10 percent of reading.
7. Temperature, Dry Bulb:

    a. Air: Within 1 deg F (0.5 deg C).
    b. Space: Within 1 deg F (0.5 deg C).

G. Outdoor: Within 2 deg F (1 deg C).Precision of I/O Reported Values: Values reported in database and displayed shall have following precision:

1. Current:

    a. Milliamperes: Nearest 1/100th of a milliampere.
    b. Amperes: Nearest 1/10th of an ampere up to 100 A; nearest ampere for 100 A and more.

2. Energy:

    a. Per electric meter provided by div. 26.:

3. Moisture (Relative Humidity):

    a. Relative Humidity (Percentage): Nearest 1 percent.

4. Position, Dampers and Valves (Percentage Open): Nearest 1 percent.
5. Pressure:

    a. Air, Ducts and Equipment: Nearest 1/10th in. w.c. (Nearest Pa up to 1000 Pa; nearest 10 Pa above 1000 Pa).
    b. Space: Nearest 1/100th in. w.c. (Nearest 1/10th Pa).

6. Temperature:

    a. Air, Ducts and Equipment: Nearest 1/10th of a degree.
    b. Outdoor: Nearest degree.
    c. Space: Nearest 1/10th of a degree.

H. Control Stability: Control variables indicated within the following limits:

1. Gas:

    a. Carbon Dioxide: Within 50 ppm.

2. Moisture (Relative Humidity):

    a. Air: Within 5 percent RH.
    b. Space: Within 5 percent RH.
    c. Outdoor: Within 5 percent RH.

3. Pressure:

    a. Air, Ducts and Equipment: 1 percent of instrument range.
    b. Space: Within 1 percent of instrument range.

4. Temperature, Dry Bulb:

    a. Air: Within 2 deg F (1 deg C)
    b. Space: Within 2 deg F (1 deg C).

I. Environmental Conditions for Controllers, Gateways, and Routers:

1. Products shall operate without performance degradation under ambient environmental temperature, pressure and humidity conditions encountered for installed location.

    a. If product alone cannot comply with requirement, install product in a protective enclosure that is isolated and protected from conditions impacting performance. Enclosure shall be internally insulated, electrically heated, cooled and ventilated as required by product and application.

J. DDC System Reliability:

1. Design, install and configure DDC controllers, gateways, routers, to yield a MTBF of at least 40,000 hours, based on a confidence level of at least 90 percent. MTBF value shall include any failure for any reason to any part of products indicated.
2. If required to comply with MTBF indicated, include DDC system and product redundancy to maintain DCC system, and associated systems and equipment that are being controlled, operational and under automatic control.
3. Critical systems and equipment that require a higher degree of DDC system redundancy than MTBF indicated shall be indicated on Drawings.

K. Electric Power Quality:

1. Power-Line Surges:

    a. Protect susceptible DDC system products connected to ac power circuits from power-line surges to comply with requirements of IEEE C62.41.
    b. Do not use fuses for surge protection.
    c. Test protection in the normal mode and in the common mode, using the following two waveforms:

        1) 10-by-1000-mic.sec. waveform with a peak voltage of 1500 V and a peak current of 60 A.
        2) 8-by-20-mic.sec. waveform with a peak voltage of 1000 V and a peak current of 500 A.

2. Power Conditioning:

    a. Protect susceptible DDC system products connected to ac power circuits from irregularities and noise rejection. Characteristics of power-line conditioner shall be as follows:

1) At 85 percent load, output voltage shall not deviate by more than plus or minus 1 percent of nominal when input voltage fluctuates between minus 20 percent to plus 10 percent of nominal.
2) During load changes from zero to full load, output voltage shall not deviate by more than plus or minus 3 percent of nominal.
3) Accomplish full correction of load switching disturbances within five cycles, and 95 percent correction within two cycles of onset of disturbance.
4) Total harmonic distortion shall not exceed 3-1/2 percent at full load.

3. Ground Fault: Protect products from ground fault by providing suitable grounding. Products shall not fail due to ground fault condition.

L. Backup Power Source:

1. HVAC systems and equipment served by a backup power source shall have associated DDC system products that control such systems and equipment also served from a backup power source.

M. UPS:

1. DDC system products powered by UPS units shall include the following:

a. Gateways.
b. DDC controllers, except application-specific controllers.

N. Continuity of Operation after Electric Power Interruption:

1. Equipment and associated factory-installed controls, field-installed controls, electrical equipment, and power supply connected to building normal and backup power systems shall automatically return equipment and associated controls to operating state occurring immediately before loss of normal power, without need for manual intervention by operator when power is restored either through backup power source or through normal power if restored before backup power is brought online.

2.4 PANEL-MOUNTED, MANUAL OVERRIDE SWITCHES

A. Manual Override of Control Dampers:

1. Include panel-mounted, two-position, selector switch for each automatic control damper being controlled by DDC controller.
2. Label each switch with damper designation served by switch.
3. Label switch positions to indicate either "Manual" or "Auto" control signal to damper.
4. With switch in "Auto" position signal to control damper actuator shall be control loop output signal from DDC controller.
5. With switch in "Manual" position, signal to damper actuator shall be controlled at panel with either an integral or separate switch to include local control.

a. For Binary Control Dampers: Manual two-position switch shall have "Close" and "Open" switch positions indicated. With switch in "Close" position, damper shall close. With switch in "Open" position, damper shall open.

b. For Analog Control Dampers: A gradual switch shall have "Close" and "Open" switch limits indicated. Operator shall be able to rotate switch knob to adjust damper to any position from close to open.

6. DDC controller shall monitor and report position of each manual override selector switch. With switch placed in "manual" position, DDC controller shall signal an override condition to alert operator that damper is under manual, not automatic, control.
7. Configure manual override switches to allow operator to manually operate damper while at panel without DDC controller installed and operational.

B. Manual Override of Control Valves:

1. Include panel-mounted, two-position, selector switch for each automatic control valve being controlled by a DDC controller.
2. Label each switch with valve designation served by switch.
3. Label switch positions to indicate either "Manual" or "Auto" control signal to valve.
4. With switch in "Auto" position, signal to control-valve actuator shall be a control loop output signal from DDC controller.
5. With switch in "Manual" position, signal to valve actuator shall be controlled at panel with either an integral or a separate switch to include local control.

2.5 SYSTEM ARCHITECTURE

A. System architecture shall consist of no more than two levels of LANs.

1. Level one LAN shall connect network controllers and operator workstations.
2. Level two LAN shall connect programmable application controllers to other programmable application controllers, and to network controllers.

B. Minimum Data Transfer and Communication Speed:

1. LAN Connecting Operator Workstations and Network Controllers: 100Mbps.
2. LAN Connecting Programmable Application Controllers: 1000 kbps.
3. LAN Connecting Application-Specific Controllers: 115,000 bps.

C. System architecture shall be modular and have inherent ability to expand to not less than two times system size indicated with no impact to performance indicated.

D. System architecture shall perform modifications without having to remove and replace existing network equipment.

E. Number of LANs and associated communication shall be transparent to operator. All I/O points residing on any LAN shall be capable of global sharing between all system LANs.

F. System design shall eliminate dependence on any single device for system alarm reporting and control execution. Each controller shall operate independently by performing its' own control, alarm management and historical data collection.

2.6 DDC SYSTEM OPERATOR INTERFACES

A. Access to system, regardless of operator means used, shall be transparent to operator.

B. Network Ports: For hardwired connection of desktop or portable operator workstation. Network port shall be easily accessible, properly protected, clearly labeled, and installed at the following locations:

1. Each mechanical equipment room.
2. Each boiler room.
3. Each different roof level with roof-mounted air-handling units or rooftop units.
4. Security system command center.
5. Fire-alarm system command center.

C. Critical Alarm Reporting:

1. Operator-selected critical alarms shall be sent by DDC system to notify operator of critical alarms that require immediate attention.
2. DDC system shall send alarm notification to multiple recipients that are assigned for each alarm.
3. DDC system shall notify recipients by any or all means, including e-mail, text message and prerecorded phone message to mobile and landline phone numbers.

D. Simultaneous Operator Use: Capable of accommodating up to five simultaneous operators that are accessing DDC system through any one of operator interfaces indicated

E. Outdoor VRF System Interface and points. Provide the following trouble shooting points.

Point Name	Point Description
Communication Status	Monitors and displays the communication status ***(General)***
Operation Mode	Monitors and displays the operation mode (Cool, Heat, Fan or Heat &Cool) ***(General)***
Outdoor Unit Alarm Status	Monitors whether or not the outdoor unit is operating normally. ***(General)***
Defrost Mode	Monitors if the defrost mode is active. ***(General)***
Oil Return Mode	Monitors whether or not the outdoor unit is in oil return operation. ***(General)***
Electric Power	Monitors and displays the electric power (calculated). ***(General)***
Electric Current	Monitors and displays the electric current (calculated). ***(General)***
System Capacity Code	Monitors and displays the system capacity code. ***(General)***
Outdoor Air Temperature	Monitors and displays the outdoor air temperature. ***(General)***
M_Condensing Pressure	Monitors and displays the condensing pressure ***(Master Module)***
M_Evaporating Pressure	Monitors and displays the evaporating pressure ***(Master Module)***
M_Condensing Temperature	Monitors and displays the condensing temperature ***(Master Module)***
M_Evaporating Temperature	Monitors and displays the evaporating temperature ***(Master Module)***

M_Inverter Compressor 1 Speed	Monitors and displays the speed of the inverter compressor1 ***(Master Module)***
M_Inverter Compressor 2 Speed	Monitors and displays the speed of the inverter compressor2 ***(Master Module)***
M_Fan Step	Monitors and displays the fan step ***(Master Module)***
M_EV Position 1	Monitors and displays the position of the expansion valve1 ***(Master Module)***
M_EV position 2	Monitors and displays the position of the expansion valve2 ***(Master Module)***
M_Hot Gas Temperature (Compressor 1)	Monitors and displays the hot gas temperature of the compressor1 ***(Master Module)***
M_Hot Gas Temperature (Compressor 2)	Monitors and displays the hot gas temperature of the compressor2 ***(Master Module)***
M_Liquid Pipe Temperature	Monitors and displays the liquid pipe temperature ***(Master Module)***
M_Liquid Pipe Temperature (HX Upper)	Monitors and displays the liquid pipe temperature for the upper HX ***(Master Module)***
M_Liquid Pipe Temperature (HX Lower)	Monitors and displays the liquid pipe temperature for the lower HX ***(Master Module)***
M_Liquid Pipe Temperature (De-Icer)	Monitors and displays the liquid pipe temperature for the de-icer ***(Master Module)***
M_Gas Pipe Temperature (HX Upper)	Monitors and displays the gas pipe temperature for the upper HX ***(Master Module)***
M_Gas Pipe Temperature (HX Lower)	Monitors and displays the gas pipe temperature for the lower HX ***(Master Module)***
M_Suction Temperature	Monitors and displays the suction temperature ***(Master Module)***
M_Compressor Suction Temperature	Monitors and displays the compressor's suction temperature ***(Master Module)***
M_Subcool Inlet Temperature	Monitors and displays the subcool inlet temperature ***(Master Module)***
M_Subcool Outlet temperature	Monitors and displays the subcool outlet temperature ***(Master Module)***
M_Subcool EV Position	Monitors and displays the subcool expansion valve position ***(Master Module)***
S1_Condensing Pressure	Monitors and displays the condensing pressure ***(Sub Module1)***
S1_Evaporating Pressure	Monitors and displays the evaporating pressure ***(Sub Module1)***
S1_Condensing Temperature	Monitors and displays the condensing temperature ***(Sub Module1)***
S1_Evaporating Temperature	Monitors and displays the evaporating temperature ***(Sub Module1)***
S1_Inverter Compressor 1 Speed	Monitors and displays the speed of the inverter compressor1 ***(Sub Module1)***
S1_Inverter Compressor 2 Speed	Monitors and displays the speed of the inverter compressor2 ***(Sub Module1)***
S1_Fan Step	Monitors and displays the fan step ***(Sub Module1)***
S1_EV Position 1	Monitors and displays the position of the expansion valve1 ***(Sub Module1)***
S1_EV position 2	Monitors and displays the position of the expansion valve2 ***(Sub Module1)***
S1_Hot Gas Temperature (Compressor 1)	Monitors and displays the hot gas temperature of the compressor1 ***(Sub Module1)***
S1_Hot Gas Temperature (Compressor 2)	Monitors and displays the hot gas temperature of the compressor2 ***(Sub Module1)***
S1_Liquid Pipe Temperature	Monitors and displays the liquid pipe temperature ***(Sub Module1)***
S1_Liquid Pipe Temperature (HX Upper)	Monitors and displays the liquid pipe temperature for the upper HX ***(Sub Module1)***

S1_Liquid Pipe Temperature (HX Lower)	Monitors and displays the liquid pipe temperature for the lower HX ***(Sub Module1)***
S1_Liquid Pipe Temperature (De-Icer)	Monitors and displays the liquid pipe temperature for the de-icer ***(Sub Module1)***
S1_Gas Pipe Temperature (HX Upper)	Monitors and displays the gas pipe temperature for the upper HX ***(Sub Module1)***
S1_Gas Pipe Temperature (HX Lower)	Monitors and displays the gas pipe temperature for the lower HX***(Sub Module1)***
S1_Suction Temperature	Monitors and displays the suction temperature ***(Sub Module1)***
S1_Compressor Suction Temperature	Monitors and displays the compressor's suction temperature ***(Sub Module1)***
S1_Subcool Inlet Temperature	Monitors and displays the subcool inlet temperature ***(Sub Module1)***
S1_Subcool Outlet temperature	Monitors and displays the subcool outlet temperature ***(Sub Module1)***
S1_Subcool EV Position	Monitors and displays the subcool expansion valve position ***(Sub Module1)***
S2_Condensing Pressure	Monitors and displays the condensing pressure ***(Sub Module2)***
S2_Evaporating Pressure	Monitors and displays the evaporating pressure ***(Sub Module2)***
S2_Condensing Temperature	Monitors and displays the condensing temperature ***(Sub Module2)***
S2_Evaporating Temperature	Monitors and displays the evaporating temperature ***(Sub Module2)***
S2_Inverter Compressor 1 Speed	Monitors and displays the speed of the inverter compressor1 ***(Sub Module2)***
S2_Inverter Compressor 2 Speed	Monitors and displays the speed of the inverter compressor2 ***(Sub Module2)***
S2_Fan Step	Monitors and displays the fan step ***(Sub Module2)***
S2_EV Position 1	Monitors and displays the position of the expansion valve1 ***(Sub Module2)***
S2_EV position 2	Monitors and displays the position of the expansion valve2 ***(Sub Module2)***
S2_Hot Gas Temperature (Compressor 1)	Monitors and displays the hot gas temperature of the compressor1 ***(Sub Module2)***
S2_Hot Gas Temperature (Compressor 2)	Monitors and displays the hot gas temperature of the compressor2 ***(Sub Module2)***
S2_Liquid Pipe Temperature	Monitors and displays the liquid pipe temperature ***(Sub Module2)***
S2_Liquid Pipe Temperature (HX Upper)	Monitors and displays the liquid pipe temperature for the upper HX ***(Sub Module2)***
S2_Liquid Pipe Temperature (HX Lower)	Monitors and displays the liquid pipe temperature for the lower HX ***(Sub Module2)***
S2_Liquid Pipe Temperature (De-Icer)	Monitors and displays the liquid pipe temperature for the de-icer ***(Sub Module2)***
S2_Gas Pipe Temperature (HX Upper)	Monitors and displays the gas pipe temperature for the upper HX ***(Sub Module2)***
S2_Gas Pipe Temperature (HX Lower)	Monitors and displays the gas pipe temperature for the lower HX***(Sub Module2)***
S2_Suction Temperature	Monitors and displays the suction temperature ***(Sub Module2)***
S2_Compressor Suction Temperature	Monitors and displays the compressor's suction temperature ***(Sub Module2)***
S2_Subcool Inlet Temperature	Monitors and displays the subcool inlet temperature ***(Sub Module2)***
S2_Subcool Outlet temperature	Monitors and displays the subcool outlet temperature ***(Sub Module2)***

2.7 NETWORKS

A. Acceptable networks for connecting operator workstations and network controllers include the following:

1. ATA 878.1, ARCNET.
2. CEA-709.1-C.
3. IP.
4. IEEE 8802-3, Ethernet.
5. BACnet/IP over Ethernet.

B. Acceptable networks for connecting programmable application controllers include the following:

1. ATA 878.1, ARCNET.
2. CEA-709.1-C.
3. IP.
4. IEEE 8802-3, Ethernet.
5. BACnet/IP over Ethernet.

C. Acceptable networks for connecting application-specific controllers include the following:

1. ATA 878.1, ARCNET.
2. CEA-709.1-C.
3. EIA-485A.
4. IP.
5. IEEE 8802-3, Ethernet.
6. BACnet/IP over Ethernet.

2.8 NETWORK COMMUNICATION PROTCOL

A. Network communication protocol(s) used throughout entire DDC system shall be open to public and available to other companies for use in making future modifications to DDC system.

B. Industry Standard Protocols:

1. DDC system shall use any one or a combination of the following industry standard protocols for network communication while complying with other DDC system requirements indicated:

a. ASHRAE 135.
b. CEA-709.1-C.
c. Modbus Application Protocol Specification V1.1b.
d. BACnet/IP over Ethernet.

2. Gateways shall be used to connect networks and network devices using different protocols.

2.9 SYSTEM SOFTWARE

A. System Software Minimum Requirements:

1. Real-time multitasking and multiuser 32-bit operating system that allows concurrent multiple operator workstations operating and concurrent execution of multiple real-time programs and custom program development.
2. Operating system shall be capable of operating DOS and Microsoft Windows applications.
3. Database management software shall manage all data on an integrated and non-redundant basis. Additions and deletions to database shall be without detriment to existing data. Include cross linkages so no data required by a program can be deleted by an operator until that data have been deleted from respective programs.
4. Network communications software shall manage and control multiple network communications to provide exchange of global information and execution of global programs.
5. Operator interface software shall include day-to-day operator transaction processing, alarm and report handling, operator privilege level and data segregation control, custom programming, and online data modification capability.
6. Scheduling software shall schedule centrally based time and event, temporary, and exception day programs.

B. Operator Interface Software:

1. Existing.
2. Operators shall be able to perform commands including, but not limited to, the following:

    a. Start or stop selected equipment.
    b. Adjust set points.
    c. Add, modify, and delete time programming.
    d. Enable and disable process execution.
    e. Lock and unlock alarm reporting for each point.
    f. Enable and disable totalization for each point.
    g. Enable and disable trending for each point.
    h. Override control loop set points.
    i. Enter temporary override schedules.
    j. Define holiday schedules.
    k. Change time and date.
    l. Enter and modify analog alarm limits.
    m. Enter and modify analog warning limits.
    n. View limits.
    o. Enable and disable demand limiting.
    p. Enable and disable duty cycle.
    q. Display logic programming for each control sequence.

3. Reporting:

    a. Generated automatically and manually.
    b. Sent to displays, printers and disk files.
    c. Types of Reporting:

1) General listing of points.
2) List points currently in alarm.
3) List of off-line points.
4) List points currently in override status.
5) List of disabled points.
6) List points currently locked out.
7) List of items defined in a "Follow-Up" file.
8) List weekly schedules.
9) List holiday programming.
10) List of limits and deadbands.

4. Summaries: For specific points, for a logical point group, for an operator selected group(s), or for entire system without restriction due to hardware configuration.

C. Project-Specific Graphics: Graphics documentation including, but not limited to, the following:

1. Site plan showing each building, and additional site elements, which are being controlled or monitored by DDC system.
2. Plan for each building floor, including interstitial floors, and each roof level of each building, showing the following:

   a. Room layouts with room identification and name.
   b. Locations and identification of all monitored and controlled HVAC equipment and other equipment being monitored and controlled by DDC system.
   c. Location and identification of each hardware point being controlled or monitored by DDC system.

3. Control schematic for each of following, including a graphic system schematic representation with point identification, set point and dynamic value indication, sequence of operation and control logic diagram.
4. Graphic display for each piece of equipment connected to DDC system through a data communications link. Include dynamic indication of all points associated with equipment.
5. DDC system network riser diagram that shows schematic layout for entire system including all networks and all controllers, gateways operator workstations and other network devices.

D. Customizing Software:

1. Software to modify and tailor DDC system to specific and unique requirements of equipment installed, to programs implemented and to staffing and operational practices planned.
2. Online modification of DDC system configuration, program parameters, and database using menu selection and keyboard entry of data into preformatted display templates.
3. As a minimum, include the following modification capability:

   a. Operator assignment shall include designation of operator passwords, access levels, point segregation and auto sign-off.
   b. Peripheral assignment capability shall include assignment of segregation groups and operators to consoles and printers, designation of backup workstations and printers, designation of workstation header points and enabling and disabling of print-out of operator changes.

c. System configuration and diagnostic capability shall include communications and peripheral port assignments, DDC controller assignments to network, DDC controller enable and disable, assignment of command trace to points and application programs and initiation of diagnostics.
d. System text addition and change capability shall include English or native language descriptors for points, segregation groups and access levels and action messages for alarms, run time and trouble condition.
e. Time and schedule change capability shall include time and date set, time and occupancy schedules, exception and holiday schedules and daylight savings time schedules.
f. Point related change capability shall include the following:

1) System and point enable and disable.
2) Run-time enable and disable.
3) Assignment of points to segregation groups, calibration tables, lockout, and run time and to a fixed I/O value.
4) Assignment of alarm and warning limits.

g. Application program change capability shall include the following:

1) Enable and disable of software programs.
2) Programming changes.
3) Assignment of comfort limits, global points, time and event initiators, time and event schedules and enable and disable time and event programs.

4. Software shall allow operator to add points, or groups of points, to DDC system and to link them to energy optimization and management programs. Additions and modifications shall be online programmable using operator workstation, downloaded to other network devices and entered into their databases. After verification of point additions and associated program operation, database shall be uploaded and recorded on hard drive and disk for archived record.
5. Include high-level language programming software capability for implementation of custom DDC programs. Software shall include a compiler, linker, and up- and down-load capability.
6. Include a library of DDC algorithms, intrinsic control operators, arithmetic, logic and relational operators for implementation of control sequences. Also include, as a minimum, the following:

a. Proportional control (P).
b. Proportional plus integral (PI).
c. Proportional plus integral plus derivative (PID).
d. Adaptive and intelligent self-learning control.

1) Algorithm shall monitor loop response to output corrections and adjust loop response characteristics according to time constant changes imposed.
2) Algorithm shall operate in a continuous self-learning manner and shall retain in memory a stored record of system dynamics so that on system shut down and restart, learning process starts from where it left off.

7. Fully implemented intrinsic control operators including sequence, reversing, ratio, time delay, time of day, highest select AO, lowest select AO, analog controlled digital output, analog control AO, and digitally controlled AO.
8. Logic operators such as "And," "Or," "Not," and others that are part of a standard set available with a high-level language.
9. Arithmetic operators such as "Add," "Subtract," "Multiply," "Divide," and others that are part of a standard set available with a high-level language.
10. Relational operators such as "Equal To," "Not Equal To," "Less Than," "Greater Than," and others that are part of a standard set available with a high-level language.

E. Alarm Handling Software:

1. Include alarm handling software to report all alarm conditions monitored and transmitted through DDC controllers, gateways and other network devices.
2. Include first in, first out handling of alarms according to alarm priority ranking, with most critical alarms first, and with buffer storage in case of simultaneous and multiple alarms.
3. Alarm handling shall be active at all times to ensure that alarms are processed even if an operator is not currently signed on to DDC system.
4. Alarms display shall include the following:

   Indication of alarm condition such as "Abnormal Off," "Hi Alarm," and "Low Alarm."

5. Alarms shall be directed to appropriate operator workstations, printers, and individual operators by privilege level and segregation assignments.
6. Alarms shall be categorized and processed by class.

   a. Class 1:

      1) Associated with fire, security and other extremely critical equipment monitoring functions; have alarm, trouble, return to normal, and acknowledge conditions printed and displayed.
      2) Unacknowledged alarms to be placed in unacknowledged alarm buffer.
      3) All conditions shall cause an audible sound and shall require individual acknowledgment to silence audible sound.

   b. Class 2:

      1) Critical, but not life-safety related, and processed same as Class 1 alarms, except do not require individual acknowledgment.
      2) Acknowledgement may be through a multiple alarm acknowledgment.

   c. Class 3:

      1) General alarms; printed, displayed and placed in unacknowledged alarm buffer queues.
      2) Each new alarm received shall cause an audible sound. Audible sound shall be silenced by "acknowledging" alarm or by pressing a "silence" key.
      3) Acknowledgement of queued alarms shall be either on an individual basis or through a multiple alarm acknowledgement.

4) Alarms returning to normal condition shall be printed and not cause an audible sound or require acknowledgment.

d. Class 4:

1) Routine maintenance or other types of warning alarms.
2) Alarms to be printed only, with no display, no audible sound and no acknowledgment required.

7. Include an unacknowledged alarm indicator on display to alert operator that there are unacknowledged alarms in system. Operator shall be able to acknowledge alarms on an individual basis or through a multiple alarm acknowledge key, depending on alarm class.

F. Reports and Logs:

1. Include reporting software package that allows operator to select, modify, or create reports using DDC system I/O point data available.
2. Each report shall be definable as to data content, format, interval and date.
3. Report data shall be sampled and stored on DDC controller, within storage limits of DDC controller, and then uploaded to archive on server for historical reporting.
4. Operator shall be able to obtain real-time logs of all I/O points by type or status, such as alarm, point lockout, or normal.
5. Reports and logs shall be stored on server hard drives in a format that is readily accessible by other standard software applications, including spreadsheets and word processing.
6. Reports and logs shall be readily printed and set to be printed either on operator command or at a specific time each day.

G. Standard Reports: Standard DDC system reports shall be provided and operator shall be able to customize reports later.

1. All I/O: With current status and values.
2. Alarm: All current alarms, except those in alarm lockout.
3. Disabled I/O: All I/O points that are disabled.
4. Alarm Lockout I/O: All I/O points in alarm lockout, whether manual or automatic.
5. Alarm Lockout I/O in Alarm: All I/O in alarm lockout that are currently in alarm.
6. Logs:

a. Alarm history.
b. System messages.
c. System events.
d. Trends.

H. Custom Reports: Operator shall be able to easily define any system data into a daily, weekly, monthly, or annual report. Reports shall be time and date stamped and shall contain a report title.

I. HVAC Equipment Reports: Prepare Project-specific reports.

J. Utility Reports: Prepare Project-specific reports.

1. Electric Report:

    a. Include weekly report showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
    b. Include monthly report showing the daily electrical consumption and peak electrical demand with time and date stamp for each meter.
    c. Include annual report showing the monthly electrical consumption and peak electrical demand with time and date stamp for each meter.
    d. For each weekly, monthly and annual report, include sum total of submeters combined by load type, such as lighting, receptacles and HVAC equipment showing daily electrical consumption and peak electrical demand.
    e. For each weekly, monthly and annual report, include sum total of all submeters in building showing electrical consumption and peak electrical demand.

2. Natural Gas Report:

    a. Include weekly report showing daily natural gas consumption and peak natural gas demand with time and date stamp for each meter.
    b. Include monthly report showing the daily natural gas consumption and peak natural gas demand with time and date stamp for each meter.
    c. Include annual report showing the monthly natural gas consumption and peak natural gas demand with time and date stamp for each meter.
    d. For each weekly, monthly and annual report, include sum total of submeters combined by load type, such as boilers and service water heaters showing daily natural gas consumption and peak natural gas demand.
    e. For each weekly, monthly and annual report, include sum total of all submeters in building showing natural gas consumption and peak natural gas demand.

3. Service Water Report:

    a. Include weekly report showing daily service water consumption and peak service water demand with time and date stamp for each meter.
    b. Include monthly report showing the daily service water consumption and peak service water demand with time and date stamp for each meter.
    c. Include annual report showing the monthly service water consumption and peak service water demand with time and date stamp for each meter.
    d. For each weekly, monthly and annual report, include sum total of submeters combined by load type, such as cooling tower makeup and irrigation showing daily service water consumption and peak service water demand.
    e. For each weekly, monthly and annual report, include sum total of all submeters in building showing service water consumption and peak service water demand.

K. Standard Trends:

1. Trend all I/O point present values, set points, and other parameters indicated for trending.
2. Trends shall be associated into groups, and a trend report shall be set up for each group.
3. Trends shall be stored within DDC controller and uploaded to hard drives automatically on reaching 75 of DDC controller buffer limit, or by operator request, or by archiving time schedule.
4. Preset trend intervals for each I/O point after review with Owner.

5. Trend intervals shall be operator selectable from 10 seconds up to 60 minutes. Minimum number of consecutive trend values stored at one time shall be 100 per variable.
6. When drive storage memory is full, most recent data shall overwrite oldest data.
7. Archived and real-time trend data shall be available for viewing numerically and graphically by operators.

L. Custom Trends: Operator shall be able to define a custom trend log for any I/O point in DDC system.

1. Each trend shall include interval, start time, and stop time.
2. Data shall be sampled and stored on DDC controller, within storage limits of DDC controller, and then uploaded to archive on server hard drives.
3. Data shall be retrievable for use in spreadsheets and standard database programs.

M. Programming Software:

1. Include programming software to execute sequences of operation indicated.
2. Include means for detecting programming errors and testing software control strategies with a simulation tool before implementing in actual control. Simulation tool may be inherent with programming software or as a separate product.

N. Database Management Software:

1. Where a separate SQL database is used for information storage, DDC system shall include database management software that separates database monitoring and managing functions by supporting multiple separate windows.
2. Database secure access shall be accomplished using standard SQL authentication including ability to access data for use outside of DDC system applications.
3. Database management function shall include summarized information on trend, alarm, event, and audit for the following database management actions:

    a. Backup.
    b. Purge.
    c. Restore.

4. Database management software shall support the following:

    a. Statistics: Display database server information and trend, alarm, event, and audit information on database.
    b. Maintenance: Include method of purging records from trend, alarm, event and audit databases by supporting separate screens for creating a backup before purging, selecting database, and allowing for retention of a selected number of day's data.
    c. Backup: Include means to create a database backup file and select a storage location.
    d. Restore: Include a restricted means of restoring a database by requiring operator to have proper security level.

5. Database management software shall include information of current database activity, including the following:

a. Ready.
b. Purging record from a database.
c. Action failed.
d. Refreshing statistics.
e. Restoring database.
f. Shrinking a database.
g. Backing up a database.
h. Resetting Internet information services.
i. Starting network device manager.
j. Shutting down the network device manager.
k. Action successful.

6. Database management software monitoring functions shall continuously read database information once operator has logged on.
7. Include operator notification through on-screen pop-up display and e-mail message when database value has exceeded a warning or alarm limit.
8. Monitoring settings window shall have the following sections:

a. Allow operator to set and review scan intervals and start times.
b. E-mail: Allow operator to create and review e-mail and phone text messages to be delivered when a warning or an alarm is generated.
c. Warning: Allow operator to define warning limit parameters, set reminder frequency and link e-mail message.
d. Alarm: Allow operator to define alarm limit parameters, set reminder frequency and link e-mail message.
e. Database Login: Protect system from unauthorized database manipulation by creating a read access and a write access for each of trend, alarm, event and audit databases as well as operator proper security access to restore a database.

9. Monitoring settings taskbar shall include the following informational icons:

a. Normal: Indicates by color and size, or other easily identifiable means that all databases are within their limits.
b. Warning: Indicates by color and size, or other easily identifiable means that one or more databases have exceeded their warning limit.
c. Alarm: Indicates by color and size, or other easily identifiable means that one or more databases have exceeded their alarm limit.

2.10 ASHRAE 135 GATEWAYS

A. Include BACnet communication ports, whenever available as an equipment OEM standard option, for integration via a single communication cable. BACnet-controlled plant equipment includes, but is not limited to, boilers, chillers, and variable-speed drives.

B. Include gateways to connect BACnet to legacy systems, existing non-BACnet devices, and existing non-BACnet DDC-controlled equipment, only when specifically requested and approved by Owner.

C. Include with each gateway an interoperability schedule showing each point or event on legacy side that BACnet "client" will read, and each parameter that BACnet network will write to.

Describe this interoperability of BACnet services, or BIBBs, defined in ASHRAE 135, Annex K.

D. Gateway Minimum Requirements:

1. Read and view all readable object properties on non-BACnet network to BACnet network and vice versa where applicable.
2. Write to all writeable object properties on non-BACnet network from BACnet network and vice versa where applicable.
3. Include single-pass (only one protocol to BACnet without intermediary protocols) translation from non-BACnet protocol to BACnet and vice versa.
4. Comply with requirements of Data Sharing Read Property, Data Sharing Write Property, Device Management Dynamic Device Binding-B, and Device Management Communication Control BIBBs according to ASHRAE 135.
5. Hardware, software, software licenses, and configuration tools for operator-to-gateway communications.
6. Backup programming and parameters on CD media and the ability to modify, download, backup, and restore gateway configuration.

2.11 ASHRAE 135 PROTOCOL ANALYZER

A. Analyzer and required cables and fittings for connection to ASHRAE 135 network.

B. Analyzer shall include the following minimum capabilities:

1. Capture and store to a file data traffic on all network levels.
2. Measure bandwidth usage.
3. Filtering options with ability to ignore select traffic.

2.12 DDC CONTROLLERS

A. DDC system shall consist of a combination of network controllers, programmable application controllers and application-specific controllers to satisfy performance requirements indicated.

B. DDC controllers shall perform monitoring, control, energy optimization and other requirements indicated.

C. DDC controllers shall use a multitasking, multiuser, real-time digital control microprocessor with a distributed network database and intelligence.

D. Each DDC controller shall be capable of full and complete operation as a completely independent unit and as a part of a DDC system wide distributed network.

E. Environment Requirements:

1. Controller hardware shall be suitable for the anticipated ambient conditions.
2. Controllers located in conditioned space shall be rated for operation at 32 to 120 deg F (Zero to 50 deg C).

3. Controllers located outdoors shall be rated for operation at 40 to 150 deg F (40 to 65 deg C).

F. Power and Noise Immunity:

1. Controller shall operate at 90 to 110 percent of nominal voltage rating and shall perform an orderly shutdown below 80 percent of nominal voltage.
2. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios with up to 5 W of power located within36 inches (900 mm) of enclosure.

G. DDC Controller Spare Processing Capacity:

1. Include spare processing memory for each controller. RAM, PROM, or EEPROM will implement requirements indicated with the following spare memory:

a. Network Controllers: 10 percent.
b. Programmable Application Controllers: Not less than 10 percent.
c. Application-Specific Controllers: Not less than 10 percent.

2. Memory shall support DDC controller's operating system and database and shall include the following:

a. Monitoring and control.
b. Energy management, operation and optimization applications.
c. Alarm management.
d. Historical trend data of all connected I/O points.
e. Maintenance applications.
f. Operator interfaces.
g. Monitoring of manual overrides.

H. DDC Controller Spare I/O Point Capacity: Include spare I/O point capacity for each controller as follows:

1. Network Controllers:

a. 10 percent of each AI, AO, BI, and BO point connected to controller.
b. Minimum Spare I/O Points per Controller:

1) AIs: Two
2) AOs: Two
3) BIs: Three
4) BOs: Three

I. Input and Output Point Interface:

1. Hardwired input and output points shall connect to network, programmable application and application-specific controllers.
2. Input and output points shall be protected so shorting of point to itself, to another point, or to ground will not damage controller.
3. Input and output points shall be protected from voltage up to 24 V of any duration so that contact will not damage controller.

4. AIs:

    a. AIs shall include monitoring of low-voltage (zero- to 10-V dc), current (4 to 20 mA) and resistance signals from thermistor and RTD sensors.
    b. AIs shall be compatible with, and field configurable to, sensor and transmitters installed.
    c. Controller AIs shall perform analog-to-digital (A-to-D) conversion with a minimum resolution of 8 bits or better to comply with accuracy requirements indicated.
    d. Signal conditioning including transient rejection shall be provided for each AI.
    e. Capable of being individually calibrated for zero and span.
    f. Incorporate common-mode noise rejection of at least 50 dB from zero to 100 Hz for differential inputs, and normal-mode noise rejection of at least 20 dB at 60 Hz from a source impedance of 10000 ohms.

5. AOs:

    a. Controller AOs shall perform analog-to-digital (A-to-D) conversion with a minimum resolution of 8 bits or better to comply with accuracy requirements indicated.
    b. Output signals shall have a range of 4 to 20 mA dc or zero- to 10-V dc as required to include proper control of output device.
    c. Capable of being individually calibrated for zero and span.
    d. AOs shall not exhibit a drift of greater than 0.4 percent of range per year.

2.13 NETWORK CONTROLLERS

A. General Network Controller Requirements:

1. Include adequate number of controllers to achieve performance indicated.
2. System shall consist of one or more independent, standalone, microprocessor-based network controllers to manage global strategies indicated.
3. Controller shall have enough memory to support its operating system, database, and programming requirements.
4. Data shall be shared between networked controllers and other network devices.
5. Operating system of controller shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and allow for central monitoring and alarms.
6. Controllers shall have a real-time clock.
7. Controller shall continually check status of its processor and memory circuits. If an abnormal operation is detected, controller shall assume a predetermined failure mode and generate an alarm notification.
8. Controllers shall be fully programmable.

B. Communication:

1. Network controllers shall communicate with other devices on DDC system Level one network.
2. Network controller also shall perform routing if connected to a network of programmable application and application-specific controllers.

C. Operator Interface:

1. Controller shall be equipped with a service communications port for connection to a portable operator's workstation.
2. Local Keypad and Display:

   a. Equip controller with local keypad and digital display for interrogating and editing data.
   b. Use of keypad and display shall require security password.

D. Serviceability:

1. Controller shall be equipped with diagnostic LEDs or other form of local visual indication of power, communication, and processor.
2. Wiring and cable connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
3. Controller shall maintain BIOS and programming information in event of a power loss for at least 72 hours.

2.14 PROGRAMMABLE APPLICATION CONTROLLERS

A. General Programmable Application Controller Requirements:

1. Include adequate number of controllers to achieve performance indicated.
2. Controller shall have enough memory to support its operating system, database, and programming requirements.
3. Data shall be shared between networked controllers and other network devices.
4. Operating system of controller shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and allow for central monitoring and alarms.
5. Controllers shall have a real-time clock.
6. Controller shall continually check status of its processor and memory circuits. If an abnormal operation is detected, controller shall assume a predetermined failure mode and generate an alarm notification.
7. Controllers shall be fully programmable.

B. Communication:

1. Programmable application controllers shall communicate with other devices on network.

2.15 APPLICATION-SPECIFIC CONTROLLERS

A. Description: Microprocessor-based controllers, which through hardware or firmware design are dedicated to control a specific piece of equipment. Controllers are not fully user-programmable but are configurable and customizable for operation of equipment they are designed to control.

1. Capable of standalone operation and shall continue to include control functions without being connected to network.
2. Data shall be shared between networked controllers and other network devices.

B. Communication: Application-specific controllers shall communicate with other application-specific controller and devices on network, and to programmable application and network controllers.

C. Operator Interface: Controller shall be equipped with a service communications port for connection to a portable operator's workstation.

D. Serviceability:

1. Controller shall be equipped with diagnostic LEDs or other form of local visual indication of power, communication, and processor.
2. Wiring and cable connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
3. Controller shall use nonvolatile memory and maintain all BIOS and programming information in event of power loss.

2.16 CONTROLLER SOFTWARE

A. General Controller Software Requirements:

1. Software applications shall reside and operate in controllers. Editing of applications shall occur at operator workstations.
2. I/O points shall be identified by up to 30-character point name and up to 16-character point descriptor. Same names shall be used at operator workstations.
3. Control functions shall be executed within controllers using DDC algorithms.
4. Controllers shall be configured to use stored default values to ensure fail-safe operation. Default values shall be used when there is a failure of a connected input instrument or loss of communication of a global point value.

B. Security:

1. Operator access shall be secured using individual security passwords and user names.
2. Passwords shall restrict operator to points, applications, and system functions as assigned by system manager.
3. Operator log-on and log-off attempts shall be recorded.
4. System shall protect itself from unauthorized use by automatically logging off after last keystroke. The delay time shall be operator-definable.

C. Scheduling: Include capability to schedule each point or group of points in system. Each schedule shall consist of the following:

1. Weekly Schedule:

a. Include separate schedules for each day of week.
b. Each schedule should include the capability for start, stop, optimal start, optimal stop, and night economizer.
c. Each schedule may consist of up to 10 events.
d. When a group of objects are scheduled together, include capability to adjust start and stop times for each member.

2. Exception Schedules:

    a. Include ability for operator to designate any day of the year as an exception schedule.
    b. Exception schedules may be defined up to a year in advance. Once an exception schedule is executed, it will be discarded and replaced by regular schedule for that day of week.

3. Holiday Schedules:

    a. Include capability for operator to define up to 99 special or holiday schedules.
    b. Schedules may be placed on scheduling calendar and will be repeated each year.
    c. Operator shall be able to define length of each holiday period.

D. System Coordination:

1. Include standard application for proper coordination of equipment.
2. Application shall include operator with a method of grouping together equipment based on function and location.
3. Group may then be used for scheduling and other applications.

E. Binary Alarms:

1. Each binary point shall be set to alarm based on operator-specified state.
2. Include capability to automatically and manually disable alarming.

F. Analog Alarms:

1. Each analog object shall have both high and low alarm limits.
2. Alarming shall be able to be automatically and manually disabled.

G. Alarm Reporting:

1. Operator shall be able to determine action to be taken in event of an alarm.
2. Alarms shall be routed to appropriate operator workstations based on time and other conditions.
3. Alarm shall be able to start programs, print, be logged in event log, generate custom messages, and display graphics.

H. Remote Communication:

1. System shall have ability to dial out in the event of an alarm.

I. Sequencing: Include application software based on sequences of operation indicated to properly sequence chillers, boilers, and other applicable HVAC equipment.

J. Control Loops:

1. Support any of the following control loops, as applicable to control required:

    a. Two-position (on/off, open/close, slow/fast) control.
    b. Proportional control.

c. Proportional plus integral (PI) control.
d. Proportional plus integral plus derivative (PID) control.

1) Include PID algorithms with direct or reverse action and anti-windup.
2) Algorithm shall calculate a time-varying analog value used to position an output or stage a series of outputs.
3) Controlled variable, set point, and PID gains shall be operator-selectable.

e. Adaptive (automatic tuning).

K. Staggered Start: Application shall prevent all controlled equipment from simultaneously restarting after a power outage. Order which equipment (or groups of equipment) is started, along with the time delay between starts, shall be operator-selectable.

L. Anti-Short Cycling:

1. BO points shall be protected from short cycling.
2. Feature shall allow minimum on-time and off-time to be selected.

M. On and Off Control with Differential:

1. Include an algorithm that allows a BO to be cycled based on a controlled variable and set point.
2. Algorithm shall be direct- or reverse-acting and incorporate an adjustable differential.

N. Run-Time Totalization:

1. Include software to totalize run-times for all BI and BO points.
2. A high run-time alarm shall be assigned, if required, by operator.

2.17 ENCLOSURES

A. General Enclosure Requirements:

1. House each controller and associated control accessories in a single enclosure. Enclosure shall serve as central tie-in point for control devices such as switches, transmitters, transducers, power supplies and transformers.
2. Do not house more than one controller in a single enclosure.
3. Include enclosure door with key locking mechanism. Key locks alike for all enclosures and include one pair of keys per enclosure.
4. Equip doors of enclosures housing controllers and components with analog or digital displays with windows to allow visual observation of displays without opening enclosure door.
5. Individual wall-mounted single-door enclosures shall not exceed 36 inches (900 mm) wide and 48 inches (1200 mm) high.

B. Environmental Requirements:

1. Evaluate temperature and humidity requirements of each product to be installed within each enclosure.

2. Calculate enclosure internal operating temperature considering heat dissipation of all products installed within enclosure and ambient effects (solar, conduction and wind) on enclosure.
3. Where required by application, include temperature-controlled electrical heat to maintain inside of enclosure above minimum operating temperature of product with most stringent requirement.
4. Where required by application, include temperature-controlled ventilation fans with filtered louver(s) to maintain inside of enclosure below maximum operating temperature of product with most stringent requirement.
5. Include temperature-controlled cooling within the enclosure for applications where ventilation fans cannot maintain inside temperature of enclosure below maximum operating temperature of product with most stringent requirement.
6. Where required by application, include humidity-controlled electric dehumidifier or cooling to maintain inside of enclosure below maximum relative humidity of product with most stringent requirement and to prevent surface condensation within enclosure.

2.18 RELAYS

A. General-Purpose Relays:

1. Relays shall be heavy duty and rated for at least 10 A at 250-V ac and 60 Hz.
2. Relays shall be either double pole double throw (DPDT) or three-pole double throw, depending on the control application.
3. Use a plug-in-style relay with an eight-pin octal plug for DPDT relays and an 11-pin octal plug for three-pole double-throw relays.
4. Construct the contacts of either silver cadmium oxide or gold.
5. Enclose the relay in a clear transparent polycarbonate dust-tight cover.
6. Relays shall have LED indication and a manual reset and push-to-test button.
7. Performance:

    a. Mechanical Life: At least 10 million cycles.
    b. Electrical Life: At least 100,000 cycles at rated load.
    c. Pickup Time: 15 ms or less.
    d. Dropout Time: 10 ms or less.
    e. Pull-in Voltage: 85 percent of rated voltage.
    f. Dropout Voltage: 50 percent of nominal rated voltage.
    g. Power Consumption: 2 VA.
    h. Ambient Operating Temperatures: Minus 40 to 115 deg F (Minus 40 to 46 deg C).

8. Equip relays with coil transient suppression to limit transients to non-damaging levels.
9. Plug each relay into an industry-standard, 35-mm DIN rail socket. Plug all relays located in control panels into sockets that are mounted on a DIN rail.
10. Relay socket shall have screw terminals. Mold into the socket the coincident screw terminal numbers and associated octal pin numbers.
11. Multifunction Time-Delay Relays:
12. Relays shall be continuous duty and rated for at least 10 A at 240-V ac and 60 Hz.
13. Relays shall be DPDT relay with up to eight programmable functions to provide on/off delay, interval and recycle timing functions.
14. Use a plug-in-style relay with either an 8- or 11-pin octal plug.
15. Construct the contacts of either silver cadmium oxide or gold.

16. Enclose the relay in a dust-tight cover.
17. Include knob and dial scale for setting delay time.
18. Performance:

    a. Mechanical Life: At least 10 million cycles.
    b. Electrical Life: At least 100,000 cycles at rated load.
    c. Timing Ranges: Multiple ranges from 0.1 seconds to 100 minutes.
    d. Repeatability: Within 2 percent.
    e. Recycle Time: 45 ms.
    f. Minimum Pulse Width Control: 50 ms.
    g. Power Consumption: 5 VA or less at 120-V ac.
    h. Ambient Operating Temperatures: Minus 40 to 115 deg F (Minus 40 to 46 deg C).

19. Equip relays with coil transient suppression to limit transients to non-damaging levels.
20. Plug each relay into an industry-standard, 35-mm DIN rail socket. Plug all relays located in control panels into sockets that are mounted on a DIN rail.
21. Relay socket shall have screw terminals. Mold into the socket the coincident screw terminal numbers and associated octal pin numbers.

B. Latching Relays:

1. Relays shall be continuous duty and rated for at least 10 A at 250-V ac and 60 Hz.
2. Relays shall be either DPDT or three-pole double throw, depending on the control application.
3. Use a plug-in-style relay with a multibladed plug.
4. Construct the contacts of either silver cadmium oxide or gold.
5. Enclose the relay in a clear transparent polycarbonate dust-tight cover.
6. Performance:

    a. Mechanical Life: At least 10 million cycles.
    b. Electrical Life: At least 100,000 cycles at rated load.
    c. Pickup Time: 15 ms or less.
    d. Dropout Time: 10 ms or less.
    e. Pull-in Voltage: 85 percent of rated voltage.
    f. Dropout Voltage: 50 percent of nominal rated voltage.
    g. Power Consumption: 2 VA.
    h. Ambient Operating Temperatures: Minus 40 to 115 deg F (Minus 40 to 46 deg C).

7. Equip relays with coil transient suppression to limit transients to non-damaging levels.
8. Plug each relay into an industry-standard, 35-mm DIN rail socket. Plug all relays located in control panels into sockets that are mounted on a DIN rail.
9. Relay socket shall have screw terminals. Mold into the socket the coincident screw terminal numbers and associated octal pin numbers.

C. Current Sensing Relay:

1. Monitors ac current.
2. Independent adjustable controls for pickup and dropout current.
3. Energized when supply voltage is present and current is above pickup setting.
4. De-energizes when monitored current is below dropout current.
5. Dropout current is adjustable from 50 to 95 percent of pickup current.

6. Include a current transformer, if required for application.
7. House current sensing relay and current transformer in its own enclosure. Use NEMA 250, Type 12 enclosure for indoors and NEMA 250, Type 4 for outdoors.

D. Combination On-Off Status Sensor and On-Off Relay:

1. Description:

a. On-off control and status indication in a single device.
b. LED status indication of activated relay and current trigger.
c. Closed-Open-Auto override switch located on the load side of the relay.

2. Performance:

a. Ambient Temperature: Minus 30 to 140 deg F (Minus 34 to 60 deg C).
b. Voltage Rating: Single-phase loads rated for 300-V ac. Three-phase loads rated for 600-V ac.

3. Status Indication:

a. Current Sensor: Integral sensing for single-phase loads up to 20 A and external solid or split sensing ring for three-phase loads up to 150 A.
b. Current Sensor Range: As required by application.
c. Current Set Point: Fixed or adjustable as required by application.
d. Current Sensor Output:

1) Solid-state, single-pole double-throw contact rated for 30-V ac and dc and for 0.4 A.
2) Solid-state, single-pole double-throw contact rated for 120-V ac and 1.0 A.
3) Analog, zero- to 5- or 10-V dc.
4) Analog, 4 to 20 mA, loop powered.

4. Relay: Single-pole double-throw, continuous-duty coil; rated for 10-million mechanical cycles.
5. Enclosure: NEMA 250, Type 1 enclosure.

2.19 ELECTRICAL POWER DEVICES

A. Transformers:

1. Transformer shall be sized for the total connected load, plus an additional 25 percent of connected load.
2. Transformer shall be at least 40 VA.
3. Transformer shall have both primary and secondary fuses.

B. Power-Line Conditioner:

1. General Power-Line Conditioner Requirements:

a. Design to ensure maximum reliability, serviceability and performance.

b. Overall function of the power-line conditioner is to receive raw, polluted electrical power and purify it for use by electronic equipment. The power-line conditioner shall provide isolated, regulated, transient and noise-free sinusoidal power to loads served.

2. Standards: NRTL listed per UL 1012.
3. Performance:

a. Single phase, continuous, 100 percent duty rated KVA/KW capacity. Design to supply power for linear or nonlinear, high crest factor, resistive and reactive loads.
b. Automatically regulate output voltage to within 2 percent or better with input voltage fluctuations of plus 10 to minus 20 percent of nominal when system is loaded 100 percent. Use Variable Range Regulation to obtain improved line voltage regulation when operating under less than full load conditions.

1) At 75 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 35 percent of nominal.
2) At 50 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 40 percent of nominal.
3) At 25 Percent Load: Output voltage automatically regulated to within 3 percent with input voltage fluctuations of plus 10 to minus 45 percent of nominal.

c. With input voltage distortion of up to 40 percent, limit the output voltage sine wave to a maximum harmonic content of 5 percent.
d. Automatically regulate output voltage to within 2.5 percent when load (resistive) changes from zero percent to 100 percent to zero percent.
e. Output voltage returns to 95 percent of nominal level within two cycles and to 100 percent within three cycles when the output is taken from no load to full resistive load or vice-versa. Recovery from partial resistive load changes is corrected in a shorter period of time.
f. K Factor: 30, designed to operate with nonlinear, non-sinusoidal, high crest factor loads without overheating.
g. Input power factor within 0.95 approaching unity with load power factor as poor as 0.6.
h. Attenuate load-generated odd current harmonics 23 dB at the input.
i. Electrically isolate the primary from the secondary. Meet isolation criteria as defined in NFPA 70, Article 250-5D.
j. Lighting and Surge Protection: Compares to UL 1449 rating of 330 V when subjected to Category B3 (6000 V/3000 A) combination waveform as established by IEEE C62.41.
k. Common-mode noise attenuation of 140 dB.
l. Transverse-mode noise attenuation of 120 dB.
m. With loss of input power for up to 16.6 ms, the output sine wave remains at usable ac voltage levels.
n. Reliability of 200,000 hours' MTBF.
o. At full load, when measured at 1-m distance, audible noise is not to exceed 54 dB.
p. Approximately 92 percent efficient at full load.

4. Transformer Construction:

    a. Ferroresonant, dry type, convection cooled, 600V class. Transformer windings of Class H (220 deg C) insulated copper.
    b. Use a Class H installation system throughout with operating temperatures not to exceed 150 deg C over a 40-deg C ambient temperature.
    c. Configure transformer primary for multi-input voltage. Include input terminals for source conductors and ground.
    d. Manufacture transformer core using M-6 grade, grain-oriented, stress-relieved transformer steel.
    e. Configure transformer secondary in a 240/120-V split with a 208-V tap or straight 120 V, depending on power output size.
    f. Electrically isolate the transformer secondary windings from the primary windings. Bond neutral conductor to cabinet enclosure and output neutral terminal.
    g. Include interface terminals for output power hot, neutral and ground conductors.
    h. Label leads, wires and terminals to correspond with circuit wiring diagram.
    i. Vacuum impregnate transformer with epoxy resin.

5. Cabinet Construction:

    a. Design for panel or floor mounting.
    b. NEMA 250, Type 1, general-purpose, indoor enclosure.
    c. Manufacture the cabinet from heavy gauge steel complying with UL 50.
    d. Include a textured baked-on paint finish.

C. Transient Voltage Suppression and High-Frequency Noise Filter Unit:

1. The maximum continuous operating voltage shall be at least 125 percent.
2. The operating frequency range shall be 47 to 63 Hz.
3. Protection modes according to NEMA LS-1.
4. The rated single-pulse surge current capacity, for each mode of protection, shall be no less than the following:

    a. Line to Neutral: 45,000 A.
    b. Neutral to Ground: 45,000 A.
    c. Line to Ground: 45,000 A.
    d. Per Phase: 90,000 A.

5. Clamping voltages shall be in compliance with test and evaluation procedures defined in NEMA LS-1. Maximum clamping voltage shall be as follows:

    a. Line to Neutral: 360 V.
    b. Line to Ground: 360 V.
    c. Neutral to Ground: 360 V.

6. Electromagnetic interference and RF interference noise rejection or attenuation values shall comply with test and evaluation procedures defined in NEMA LS-1.

    a. Line to Neutral:

        1) 100 kHz: 42 dB.

2) 1 MHz: 25 dB.
3) 10 MHz: 21 dB.
4) 100 MHz: 36 dB.

b. Line to Ground:

1) 100 kHz: 16 dB.
2) 1 MHz: 55 dB.
3) 10 MHz: 81 dB.
4) 100 MHz: 80 dB.

7. Unit shall have LED status indicator that extinguishes to indicate a failure.
8. Unit shall be listed by an NRTL as a transient voltage surge suppressor per UL 1449, and as an electromagnetic interference filter per UL 1283.
9. Unit shall not generate any appreciable magnetic field.
10. Unit shall not generate an audible noise.

D. DC Power Supply:

1. Plug-in style suitable for mating with a standard eight-pin octal socket. Include the power supply with a mating mounting socket.
2. Enclose circuitry in a housing.
3. Include both line and load regulation to ensure a stable output. To protect both the power supply and the load, power supply shall have an automatic current limiting circuit.
4. Performance:

a. Output voltage nominally 25-V dc within 5 percent.
b. Output current up to 100 mA.
c. Input voltage nominally 120-V ac, 60 Hz.
d. Load regulation within 0.5 percent from zero- to 100-mA load.
e. Line regulation within 0.5 percent at a 100-mA load for a 10 percent line change.
f. Stability within 0.1 percent of rated volts for 24 hours after a 20-minute warmup.

2.20 UNINTERRUPTABLE POWER SUPPLY (UPS) UNITS

A. 250 through 1000 VA:

1. UPS units shall provide continuous, regulated output power without using their batteries during brown-out, surge, and spike conditions.
2. Load served shall not exceed 75 percent of UPS rated capacity, including power factor of connected loads.

a. Larger-capacity units shall be provided for systems with larger connected loads.
b. UPS shall provide five minutes of battery power.

3. Performance:

a. Input Voltage: Single phase, 120- or 230-V ac, compatible with field power source.
b. Load Power Factor Range (Crest Factor): 0.65 to 1.0.

c. Output Voltage: 101- to 132-V ac, while input voltage varies between 89 and 152-V ac.
d. On Battery Output Voltage: Sine wave.
e. Inverter overload capacity shall be minimum 150 percent for 30 seconds.
f. Recharge time shall be a maximum of six hours to 90 percent capacity after full discharge to cutoff.
g. Transfer Time: 6 ms.
h. Surge Voltage Withstand Capacity: IEEE C62.41, Categories A and B; 6 kV/200 and 500 A; 100-kHz ringwave.

4. UPS shall be automatic during fault or overload conditions.
5. Unit with integral line-interactive, power condition topology to eliminate all power contaminants.
6. Include front panel with power switch and visual indication of power, battery, fault and temperature.
7. Unit shall include an audible alarm of faults and front panel silence feature.
8. Unit with four NEMA WD 1, NEMA WD 6 Configuration 5-15R receptacles.
9. UPS shall include dry contacts (digital output points) for low battery condition and battery-on (primary utility power failure) and connect the points to the DDC system.
10. Batteries shall be sealed lead-acid type and be maintenance free. Battery replacement shall be front accessible by user without dropping load.
11. Include tower models installed in ventilated cabinets to the particular installation location.

B. 1000 through 3000 VA:

1. UPS units shall provide continuous, regulated output power without using their batteries during brown-out, surge, and spike conditions.
2. Load served shall not exceed 75 percent of UPS rated capacity, including power factor of connected loads.

a. Larger-capacity units, or multiple units, shall be provided for systems with larger connected loads.
b. UPS shall provide five minutes of battery power.

3. Performance:

a. Input Voltage: Single phase, 120-V ac, plus 20 to minus 30 percent.
b. Power Factor: Minimum 0.97 at full load.
c. Output Voltage: Single phase, 120-V ac, within 3 percent, steady state with rated output current of 10.0 A, 30.0-A peak.
d. Inverter overload capacity shall be minimum 150 percent for 30 seconds.
e. Recharge time shall be a maximum of eight hours to 90 percent capacity.

4. UPS bypass shall be automatic during fault or overload conditions.
5. UPS shall include dry contacts (digital output points) for low battery condition and battery-on (primary utility power failure) and connect the points to the DDC system.
6. Batteries shall be sealed lead-acid type and be maintenance free.
7. Include tower models installed in ventilated cabinets or rack models installed on matching racks, as applicable to the particular installation location and space availability/configuration.

2.21 CONTROL WIRE AND CABLE

A. Wire: Single conductor control wiring above 24 V.

1. Wire size shall be at least No. 18 AWG.
2. Conductor shall be 7/24 soft annealed copper strand with 2- to 2.5-inch (50- to 65-mm) lay.
3. Conductor insulation shall be 600 V, Type THWN or Type THHN, and 90 deg C according to UL 83.
4. Conductor colors shall be black (hot), white (neutral), and green (ground).
5. Furnish wire on spools.

B. Single Twisted Shielded Instrumentation Cable above 24 V:

1. Wire size shall be a minimum No. 18 AWG.
2. Conductors shall be a twisted, 7/24 soft annealed copper strand with a 2- to 2.5-inch (50- to 65-mm) lay.
3. Conductor insulation shall have a Type THHN/THWN or Type TFN rating.
4. Shielding shall be 100 percent type, 0.35/0.5-mil aluminum/Mylar tape, helically applied with 25 percent overlap, and aluminum side in with tinned copper drain wire.
5. Outer jacket insulation shall have a 600-V, 90-deg C rating and shall be Type TC cable.
6. For twisted pair, conductor colors shall be black and white. For twisted triad, conductor colors shall be black, red and white.
7. Furnish wire on spools.

C. Single Twisted Shielded Instrumentation Cable 24 V and Less:

1. Wire size shall be a minimum No. 18 AWG.
2. Conductors shall be a twisted, 7/24 soft annealed copper stranding with a 2- to 2.5-inch (50- to 65-mm) lay.
3. Conductor insulation shall have a nominal 15-mil thickness, constructed from flame-retardant PVC.
4. Shielding shall be 100 percent type, 1.35-mil aluminum/polymer tape, helically applied with 25 percent overlap, and aluminum side in with tinned copper drain wire.
5. Outer jacket insulation shall have a 300-V, 105-deg C rating and shall be Type PLTC cable.
6. For twisted pair, conductor colors shall be black and white. For twisted triad, conductor colors shall be black, red and white.
7. Furnish wire on spools.

D. LAN and Communication Cable: Comply with DDC system manufacturer requirements for network being installed.

1. Cable shall be plenum rated.
2. Cable shall comply with NFPA 70.
3. Cable shall have a unique color that is different from other cables used on Project.

2.22 RACEWAYS FOR CONTROL WIRING, CABLING, AND TUBING

A. Metal Conduits, Tubing, and Fittings:

1. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. GRC: Comply with NEMA ANSI C80.1 and UL 6.
3. ARC: Comply with NEMA ANSI C80.5 and UL 6A.
4. IMC: Comply with NEMA ANSI C80.6 and UL 1242.
5. PVC-Coated Steel Conduit: PVC-coated.

    a. Comply with NEMA RN 1.
    b. Coating Thickness: 0.040 inch (1 mm), minimum.

6. EMT: Comply with NEMA ANSI C80.3 and UL 797.
7. FMC: Comply with UL 1; zinc-coated steel.
8. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
9. Fittings for Metal Conduit: Comply with NEMA ANSI FB 1 and UL 514B.

    a. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
    b. Fittings for EMT:

        1) Material: Steel.
        2) Type: Setscrew.

    c. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
    d. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

10. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

B. Nonmetallic Conduits, Tubing, and Fittings:

1. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. ENT: Comply with NEMA TC 13 and UL 1653.
3. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
4. LFNC: Comply with UL 1660.
5. Rigid HDPE: Comply with UL 651A.
6. Continuous HDPE: Comply with UL 651A.
7. Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D 3485.
8. RTRC: Comply with UL 2515A and NEMA TC 14.
9. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
10. Fittings for LFNC: Comply with UL 514B.

11. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less.
12. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Metal Wireways and Auxiliary Gutters:

1. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1, Type 3R, Type 4, Type 12 unless otherwise indicated, and sized according to NFPA 70.

    a. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
3. Wireway Covers: Hinged, Screw-cover, Flanged-and-gasketed type unless otherwise indicated.
4. Finish: Manufacturer's standard enamel finish.

D. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color as selected by Architect Prime coated, ready for field painting.

2.23 CONTROL POWER WIRING AND RACEWAYS

A. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" electrical power conductors and cables.

B. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for electrical power raceways and boxes.

2.24 ACCESSORIES

A. Damper Blade Limit Switches:

1. Sense positive open and/or closed position of the damper blades.
2. NEMA 250, Type 13, oil-tight construction.
3. Arrange for the mounting application.
4. Additional waterproof enclosure when required by its environment.
5. Arrange to prevent "over-center" operation.

B. Instrument Enclosures:

1. Include instrument enclosure for secondary protection to comply with requirements indicated in "Performance Requirements" Article.
2. NRTL listed and labeled to UL 50.
3. Sized to include at least 25 percent spare area on subpanel.
4. Instrument(s) mounted within enclosure on internal subpanel(s).
5. Enclosure face with engraved, laminated phenolic nameplate for each instrument within enclosure.
6. Enclosures housing pneumatic instruments shall include main pressure gage and a branch pressure gage for each pneumatic device, installed inside.
7. Enclosures housing multiple instruments shall route tubing and wiring within enclosure in a raceway having a continuous removable cover.
8. Enclosures larger than 12 inches (300 mm) shall have a hinged full-size face cover.
9. Equip enclosure with lock and common key.

C. Manual Valves:

1. Needle Type:

   a. PTFE packing.
   b. Construct of brass for use with copper and polyethylene tubing and of stainless steel for use with stainless-steel tubing.
   c. Aluminum T-bar handle.
   d. Include tubing connections.

2. Ball Type:

   a. Body: Bronze ASTM B 62 or ASTM B 61.
   b. Ball: Type 316 stainless steel.
   c. Stem: Type 316 stainless steel.
   d. Seats: Reinforced PTFE.
   e. Packing Ring: Reinforced PTFE.
   f. Lever: Stainless steel with a vinyl grip.
   g. 600 WOG.
   h. Threaded end connections.

2.25 IDENTIFICATION

A. Control Equipment, Instruments, and Control Devices:

1. Engraved tag bearing unique identification.

   a. Include instruments with unique identification identified by equipment being controlled or monitored, followed by point identification.

2. Tag shall consist of white lettering on black background.
3. Tag shall be engraved phenolic consisting of three layers of rigid laminate. Top and bottom layers are color-coded black with contrasting white center exposed by engraving through outer layer.
4. Tag shall be fastened with drive pins.

5. Instruments, control devices and actuators with Project-specific identification tags having unique identification numbers following requirements indicated and provided by original manufacturer do not require an additional tag.

B. Valve Tags:

1. Brass tags and brass chains attached to valve.
2. Tags shall be at least 1.5 inches (38 mm) in diameter.
3. Include tag with unique valve identification indicating control influence such as flow, level, pressure, or temperature; followed by location of valve, and followed by three-digit sequential number. For example: TV-1.001.
4. Valves with Project-specific identification tags having unique identification numbers following requirements indicated and provided by original manufacturer do not require an additional tag.

C. Raceway and Boxes:

1. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
2. Paint cover plates on junction boxes and conduit same color as the tape banding for conduits. After painting, label cover plate "HVAC Controls," using an engraved phenolic tag.
3. For raceways housing pneumatic tubing, add a phenolic tag labeled "HVAC Instrument Air Tubing."
4. For raceways housing air signal tubing, add a phenolic tag labeled "HVAC Air Signal Tubing."

D. Equipment Warning Labels:

1. Acrylic label with pressure-sensitive adhesive back and peel-off protective jacket.
2. Lettering size shall be at least 14-point type with white lettering on red background.
3. Warning label shall read "CAUTION-Equipment operated under remote automatic control and may start or stop at any time without warning. Switch electric power disconnecting means to OFF position before servicing."
4. Lettering shall be enclosed in a white line border. Edge of label shall extend at least 0.25 inch (6 mm)beyond white border.

2.26 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate the following according to industry standards for each product, and to verify DDC system reliability specified in performance requirements:

1. DDC controllers.
2. Gateways.
3. Routers.

B. Product(s) and material(s) will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify compatibility with and suitability of substrates.

B. Examine roughing-in for products to verify actual locations of connections before installation.

1. Examine roughing-in for instruments installed in piping to verify actual locations of connections before installation.
2. Examine roughing-in for instruments installed in duct systems to verify actual locations of connections before installation.

C. Examine walls, floors, roofs, and ceilings for suitable conditions where product will be installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install products to satisfy more stringent of all requirements indicated.

B. Install products level, plumb, parallel, and perpendicular with building construction.

C. Support products, tubing, piping wiring and raceways. Brace products to prevent lateral movement and sway or a break in attachment when subjected to a force.

D. If codes and referenced standards are more stringent than requirements indicated, comply with requirements in codes and referenced standards.

E. Fabricate openings and install sleeves in ceilings, floors, roof, and walls required by installation of products. Before proceeding with drilling, punching, and cutting, check for concealed work to avoid damage. Patch, flash, grout, seal, and refinish openings to match adjacent condition.

F. Firestop penetrations made in fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

G. Seal penetrations made in acoustically rated assemblies. Comply with requirements in Section 079200 "Joint Sealants."

H. Welding Requirements:

1. Restrict welding and burning to supports and bracing.

2. No equipment shall be cut or welded without approval. Welding or cutting will not be approved if there is risk of damage to adjacent Work.
3. Welding, where approved, shall be by inert-gas electric arc process and shall be performed by qualified welders according to applicable welding codes.
4. If requested on-site, show satisfactory evidence of welder certificates indicating ability to perform welding work intended.

I. Fastening Hardware:

1. Stillson wrenches, pliers, and other tools that damage surfaces of rods, nuts, and other parts are prohibited for work of assembling and tightening fasteners.
2. Tighten bolts and nuts firmly and uniformly. Do not overstress threads by excessive force or by oversized wrenches.
3. Lubricate threads of bolts, nuts and screws with graphite and oil before assembly.

J. If product locations are not indicated, install products in locations that are accessible and that will permit service and maintenance from floor, equipment platforms, or catwalks without removal of permanently installed furniture and equipment.

3.3 ELECTRIC POWER CONNECTIONS

A. Connect electrical power to DDC system products requiring electrical power connections.

B. Design of electrical power to products not indicated with electric power is delegated to DDC system provider and installing trade. Work shall comply with NFPA 70 and other requirements indicated.

3.4 IDENTIFICATION

A. Install engraved phenolic nameplate with unique identification on face for each of the following:

1. Operator workstation.
2. Server.
3. Printer.
4. Gateway.
5. Router.
6. Protocol analyzer.
7. DDC controller.
8. Enclosure.
9. Electrical power device.
10. Accessory.

B. Install engraved phenolic nameplate with unique instrument identification on face of each instrument connected to a DDC controller.

C. Install engraved phenolic nameplate with identification on face of each control damper actuator connected to a DDC controller.

D. Where product is installed above accessible tile ceiling, also install matching engraved phenolic nameplate with identification on face of ceiling grid located directly below.

E. Where product is installed above an inaccessible ceiling, also install engraved phenolic nameplate with identification on face of access door directly below.

F. Warning Labels:

1. Shall be permanently attached to equipment that can be automatically started by DDC control system.
2. Shall be located in highly visible location near power service entry points.

3.5 CONTROL WIRE, CABLE AND RACEWAYS INSTALLATION

A. Comply with NECA 1.

B. Comply with TIA 568-C.1.

C. Wiring Method: Install cables in raceways and cable trays except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.

D. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

E. Field Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

F. Conduit Installation:

1. Install conduit expansion joints where conduit runs exceed 200 feet (60 m), and conduit crosses building expansion joints.
2. Coordinate conduit routing with other trades to avoid conflicts with ducts, pipes and equipment and service clearance.
3. Maintain at least 3-inch (75-mm) separation where conduits run axially above or below ducts and pipes.
4. Limit above-grade conduit runs to 100 feet (30 m) without pull or junction box.
5. Do not install raceways or electrical items on any "explosion-relief" walls, or rotating equipment.
6. Do not fasten conduits onto the bottom side of a metal deck roof.
7. Flexible conduit is permitted only where flexibility and vibration control is required.
8. Limit flexible conduit to 3 feet (1 m) long.
9. Conduit shall be continuous from outlet to outlet, from outlet to enclosures, pull and junction boxes, and shall be secured to boxes in such manner that each system shall be electrically continuous throughout.
10. Direct bury conduits underground or install in concrete-encased duct bank where indicated.

a. Use rigid, nonmetallic, Schedule 80 PVC.
b. Provide a burial depth according to NFPA 70, but not less than 24 inches (600 mm).

11. Secure threaded conduit entering an instrument enclosure, cabinet, box, and trough, with a locknut on outside and inside, such that conduit system is electrically continuous throughout. Provide a metal bushing on inside with insulated throats. Locknuts shall be the type designed to bite into the metal or, on inside of enclosure, shall have a grounding wedge lug under locknut.
12. Conduit box-type connectors for conduit entering enclosures shall have an insulated throat.
13. Connect conduit entering enclosures in wet locations with box-type connectors or with watertight sealing locknuts or other fittings.
14. Offset conduits where entering surface-mounted equipment.
15. Seal conduit runs used by sealing fittings to prevent the circulation of air for the following:

a. Conduit extending from interior to exterior of building.
b. Conduit extending into pressurized duct and equipment.
c. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.

G. Wire and Cable Installation:

1. Cables serving a common system may be grouped in a common raceway. Install control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
2. Install cables with protective sheathing that is waterproof and capable of withstanding continuous temperatures of 90 deg C with no measurable effect on physical and electrical properties of cable.

a. Provide shielding to prevent interference and distortion from adjacent cables and equipment.

3. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
5. UTP Cable Installation:

a. Comply with TIA 568-C.2.
b. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination, to maintain cable geometry.

6. Installation of Cable Routed Exposed under Raised Floors:

a. Install plenum-rated cable only.
b. Install cabling after the flooring system has been installed in raised floor areas.
c. Coil cable 6 feet (1.8 m) long not less than 12 inches (300 mm) in diameter below each feed point.

7. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire shall have a unique tag.
8. Provide strain relief.
9. Terminate wiring in a junction box.

    a. Clamp cable over jacket in junction box.
    b. Individual conductors in the stripped section of the cable shall be slack between the clamping point and terminal block.

10. Terminate field wiring and cable not directly connected to instruments and control devices having integral wiring terminals using terminal blocks.
11. Install signal transmission components according to IEEE C2, REA Form 511a, NFPA 70, and as indicated.
12. Keep runs short. Allow extra length for connecting to terminal boards. Do not bend flexible coaxial cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
13. Ground wire shall be copper and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.
14. Wire and cable shall be continuous from terminal to terminal without splices.
15. Use insulated spade lugs for wire and cable connection to screw terminals.
16. Use shielded cable to transmitters.
17. Use shielded cable to temperature sensors.
18. Perform continuity and meager testing on wire and cable after installation.
19. Do not install bruised, kinked, scored, deformed, or abraded wire and cable. Remove and discard wire and cable if damaged during installation, and replace it with new cable.
20. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
21. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
22. Protection from Electro-Magnetic Interference (EMI): Provide installation free of (EMI). As a minimum, comply with the following requirements:

    a. Comply with BICSI TDMM and TIA 569-C for separating unshielded cable from potential EMI sources, including electrical power lines and equipment.
    b. Separation between open cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

        1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
        2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
        3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

    c. Separation between cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

        1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).

2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

d. Separation between cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

e. Separation between Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches (1200 mm).
f. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and installations, including connections.

C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Testing of Pneumatic and Air-Signal Tubing:

a. Test for leaks and obstructions.
b. Disconnect each pipe and tubing line before a test is performed, and blowout dust, dirt, trash, condensate and other foreign materials with compressed air. Use commercially pure compressed air or nitrogen as distributed in gas cylinders. Air from an oil-free compressor with an air dryer is an acceptable alternative for the test.
c. After foreign matter is expelled and line is free from obstructions, plug far end of tubing run.
d. Connect a pressure source to near end of run with a needle valve between air supply and tubing run.
e. Connect a pressure gage accurate to within 0.5 percent of test between the shutoff needle valve and tubing run under test.

f. For system pressures above 30 psig (207 kPa), apply a pressure of 1.5 times operating pressure. Record pressure in tubing run every 10 minutes for one hour. Allowable drop in pressure in one-hour period shall not exceed 1 psig (6.9 kPa).
g. For system pressures 30 psig (207 kPa) and below, apply a pressure of 2.0 times operating pressure to piping and tubing run. Record pressure in tubing run every 5 minutes for one hour. Allowable drop in pressure in one-hour period shall not exceed 0.5 psig (3.5 kPa).

D. Testing:

1. Perform preinstallation, in-progress, and final tests, supplemented by additional tests, as necessary.
2. Preinstallation Cable Verification: Verify integrity and serviceability for new cable lengths before installation. This assurance may be provided by using vendor verification documents, testing, or other methods. As a minimum, furnish evidence of verification for cable attenuation and bandwidth parameters.
3. In-Progress Testing: Perform standard tests for correct pair identification and termination during installation to ensure proper installation and cable placement. Perform tests in addition to those specified if there is any reason to question condition of material furnished and installed. Testing accomplished is to be documented by agency conducting tests. Submit test results for Project record.
4. Final Testing: Perform final test of installed system to demonstrate acceptability as installed. Testing shall be performed according to a test plan supplied by DDC system manufacturer. Defective Work or material shall be corrected and retested. As a minimum, final testing for cable system, including spare cable, shall verify conformance of attenuation, length, and bandwidth parameters with performance indicated.
5. Test Equipment: Use a fiber-optic time domain reflectometer for testing of length and optical connectivity.
6. Test Results: Record test results and submit copy of test results for Project record.

3.7 DDC SYSTEM WIRELESS NETWORK VERIFICATION

A. DDC system Installer shall design wireless DDC system networks to comply with performance requirements indicated.

B. Installer shall verify wireless network performance through field testing and shall document results in a field test report.

C. Testing and verification of all wireless devices shall include, but not be limited to, the following:

1. Speed.
2. Online status.
3. Signal strength.

3.8 FINAL REVIEW

A. Submit written request to Architect and Construction Manager when DDC system is ready for final review. Written request shall state the following:

1. DDC system has been thoroughly inspected for compliance with contract documents and found to be in full compliance.
2. DDC system has been calibrated, adjusted and tested and found to comply with requirements of operational stability, accuracy, speed and other performance requirements indicated.
3. DDC system monitoring and control of HVAC systems results in operation according to sequences of operation indicated.
4. DDC system is complete and ready for final review.

B. Review by Construction Manager shall be made after receipt of written request. A field report shall be issued to document observations and deficiencies.

C. Take prompt action to remedy deficiencies indicated in field report and submit a second written request when all deficiencies have been corrected. Repeat process until no deficiencies are reported.

D. Should more than two reviews be required, DDC system manufacturer and Installer shall compensate entity performing review for total costs, labor and expenses, associated with third and subsequent reviews. Estimated cost of each review shall be submitted and approved by DDC system manufacturer and Installer before making the review.

E. Prepare and submit closeout submittals when no deficiencies are reported.

F. A part of DDC system final review shall include a demonstration to parties participating in final review.

1. Provide staff familiar with DDC system installed to demonstrate operation of DDC system during final review.
2. Provide testing equipment to demonstrate accuracy and other performance requirements of DDC system that is requested by reviewers during final review.

3.9 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.10 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include three months' full maintenance by DDC system manufacturer's authorized service representative. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, calibration and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative with complete knowledge of Project-specific system installed to train Owner's maintenance personnel to adjust, operate, and maintain DDC system.

END OF SECTION 230923

SECTION 231123

FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves.
5. Pressure regulators.
6. Service meters.
7. Concrete bases.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig (690 kPa) minimum unless otherwise indicated.
2. Service Regulators: 100 psig (690 kPa) minimum unless otherwise indicated.

B. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 2 psig (13.8 kPa) but not more than 5 psig (34.5 kPa), and is reduced to secondary pressure of more than 0.5 psig (3.45 kPa) but not more than 2 psig (13.8 kPa).

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Piping specialties.
2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Pressure regulators. Indicate pressure ratings and capacities.
4. Dielectric fittings.

B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

1. Shop Drawing Scale: 1/4 inch per foot (1:50).
2. Detail mounting, supports, and valve arrangements for pressure regulator assembly.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.

B. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.

C. Qualification Data: For qualified professional engineer.

D. Welding certificates.

E. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Forpressure regulators to include in emergency, operation, and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

D. Protect stored PE pipes and valves from direct sunlight.

1.10 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

1.11 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Section 083113 "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

    a. Material Group: 1.1.
    b. End Connections: Threaded or butt welding to match pipe.
    c. Lapped Face: Not permitted underground.
    d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
    e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.

5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

    a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

6. Mechanical Couplings:

    a. Buna-nitrile seals.
    b. Steel bolts, washers, and nuts.
    c. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
    d. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

B. PE Pipe: ASTM D 2513, SDR 11.

1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.

    a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
    b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. Vent casing aboveground.
    c. Aboveground Portion: PE transition fitting.
    d. Outlet shall be threaded or flanged or suitable for welded connection.
    e. Tracer wire connection.
    f. Ultraviolet shield.
    g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

4. Transition Service-Line Risers: Factory fabricated and leak tested.

    a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
    b. Outlet shall be threaded or flanged or suitable for welded connection.
    c. Bridging sleeve over mechanical coupling.
    d. Factory-connected anode.
    e. Tracer wire connection.
    f. Ultraviolet shield.
    g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.

2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.
5. Operating-Pressure Rating: 0.5 psig (3.45 kPa).
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches (1830 mm.)

B. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
3. Strainer Screen: [40] [60]-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig (862 kPa).

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 (DN 50) and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig (862 kPa).
2. Threaded Ends: Comply with ASME B1.20.1.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
4. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch (25 mm) and smaller.
5. Service Mark: Valves 1-1/4 inches (32 mm) to NPS 2 (DN 50) shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 (DN 65) and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig (862 kPa).
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. Cast-Iron, Lubricated Plug Valves: MSS SP-78.

1. Body: Cast iron, complying with ASTM A 126, Class B.
2. Plug: Bronze or nickel-plated cast iron.
3. Seat: Coated with thermoplastic.
4. Stem Seal: Compatible with natural gas.
5. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
6. Operator: Square head or lug type with tamperproof feature where indicated.
7. Pressure Class: 125 psig (862 kPa).
8. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
9. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 EARTHQUAKE VALVES

A. Earthquake Valves: Comply with ASCE 25.

1. Safe-T-Quake
2. Or approved equal.
3. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction.
4. Maximum Operating Pressure: 5 psig (34.5 kPa).
5. Cast-aluminum body with nickel-plated chrome steel internal parts.
6. Nitrile-rubber valve washer.
7. Sight windows for visual indication of valve position.
8. Threaded end connections complying with ASME B1.20.1.
9. Wall mounting bracket with bubble level indicator.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 (DN 50) and smaller; flanged for regulators NPS 2-1/2 (DN 65) and larger.

B. Service Pressure Regulators: Comply with ANSI Z21.80.

1. Sensus
2. Emerson
3. Or approved equal.
4. Body and Diaphragm Case: Cast iron or die-cast aluminum.
5. Springs: Zinc-plated steel; interchangeable.
6. Diaphragm Plate: Zinc-plated steel.
7. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.

8. Orifice: Aluminum; interchangeable.
9. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
10. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
11. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
12. Overpressure Protection Device: Factory mounted on pressure regulator.
13. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
14. Maximum Inlet Pressure: [100 psig (690 kPa)] <Insert pressure>.

2.7 SERVICE METERS

A. By Utility Company.

2.8 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Description:

a. Standard: ASSE 1079.
b. Pressure Rating: [125 psig (860 kPa) minimum at 180 deg F (82 deg C)] [150 psig (1035 kPa)] [250 psig (1725 kPa)].
c. End Connections: Solder-joint copper alloy and threaded ferrous.

2.9 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to NFPA 54 to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches (900 mm) below finished grade. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

1. If natural-gas piping is installed less than 36 inches (900 mm) below finished grade, install it in containment conduit.

C. Install underground, PE, natural-gas piping according to ASTM D 2774.

D. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
3. Replace pipe having damaged PE coating with new pipe.

E. Install fittings for changes in direction and branch connections.

F. Install pressure gage upstream and downstream from each service regulator. Pressure gages are specified in Section 230519 “Meters and Gages for HVAC Piping.”

3.4 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Locate valves for easy access.

H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Verify final equipment locations for roughing-in.

L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.

M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.

1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches (75 mm) long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

P. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.

1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches (38 mm) of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
3. In Floor Channels: Install natural-gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation.
4. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.

a. Exception: Tubing passing through partitions or walls does not require striker barriers.

5. Prohibited Locations:

a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
b. Do not install natural-gas piping in solid walls or partitions.

Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

R. Connect branch piping from top or side of horizontal piping.

S. Install unions in pipes NPS 2 (DN 50) and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

T. Do not use natural-gas piping as grounding electrode.

U. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

V. Install pressure gage upstream and downstream from each line regulator. Pressure gages are specified in Section 230519 “Meters and Gages for HVAC Piping.”

W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 “Sleeves and Sleeve Seals for HVAC Piping.”

X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeves specified in Section 230517 “Sleeves and Sleeve Seals for HVAC Piping.”

Y. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.5 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

C. Install earthquake valves aboveground outside buildings according to listing.

D. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 HANGER AND SUPPORT INSTALLATION

A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

C. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1 (DN 25) and Smaller: Maximum span, 96 inches (2438 mm); minimum rod size, 3/8 inch (10 mm).
2. NPS 1-1/4 (DN 32): Maximum span, 108 inches (2743 mm); minimum rod size, 3/8 inch (10 mm).
3. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): Maximum span, 108 inches (2743 mm); minimum rod size, 3/8 inch (10 mm).
4. NPS 2-1/2 to NPS 3-1/2 (DN 65 to DN 90): Maximum span, 10 feet (3 m); minimum rod size, 1/2 inch (13 mm).

3.8 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches (1800 mm) of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

A. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for piping and valve identification.

B. Install detectable warning tape directly above gas piping, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.10 PAINTING

A. Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for painting interior and exterior natural-gas piping.

B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.

    a. Prime Coat: Alkyd anticorrosive metal primer.
    b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
    c. Topcoat: Exterior alkyd enamel (flat).
    d. Color: Gray.

C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.

2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on [18-inch (450-mm)] <Insert dimension> centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Use 3000-psig (20.7-MPa), 28-day, compressive-strength concrete and reinforcement as specified in "Section 033053 "Miscellaneous Cast-in-Place Concrete."]

3.12 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction.

C. Natural-gas piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.13 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.14 OUTDOOR PIPING SCHEDULE

A. Underground natural-gas piping shall be the following:

1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.

B. Aboveground natural-gas piping shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

C. Branch Piping in Cast-in-Place Concrete to Single Appliance: Annealed-temper copper tube with wrought-copper fittings and brazed joints. Install piping embedded in concrete with no joints in concrete.

D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.15 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG (3.45 kPa)

A. Aboveground, branch piping [NPS 1 (DN 25)] <Insert pipe size> and smaller shall be the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground, distribution piping shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

C. Underground, below building, piping shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.16 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 0.5 PSIG (3.45 kPa) AND LESS THAN 5 PSIG (34.5 kPa)

A. Aboveground, branch piping NPS 1 (DN 25) and smaller shall be the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground, distribution piping shall be the following:

1. Steel pipe with steel welding fittings and welded joints.

C. Underground, below building, piping shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat underground pipe and fittings with protective coating for steel piping.

E. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

3.17 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes NPS 2 (DN 50) and smaller at service meter shall be the following:

1. Bronze plug valve.

B. Valves in branch piping for single appliance shall be the following:

1. Two-piece, full-port, bronze ball valves with bronze trim.

END OF SECTION 231123

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Refrigerant pipes and fittings.
2. Refrigerant piping valves and specialties.
3. Refrigerants.

B. Related Sections:

1. 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS for additional LEED (Leadership in Energy & Environmental Design) requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty.

1. Include pressure drop, based on manufacturer's test data, for the following:

a. Thermostatic expansion valves.
b. Solenoid valves.
c. Hot-gas bypass valves.
d. Filter dryers.
e. Strainers.
f. Pressure-regulating valves.

1.4 LEED Submittals:

A. Provide product certificates or other back-up documentation for any product meeting the following LEED credits. Also include material costs, excluding cost of installation, for all materials.

1. Environmental Product Declarations
2. Multi-Attribute Optimization
3. Raw Material Source and Extraction Reporting

4. Leadership Extraction Practices
5. Material Ingredient Reporting
6. Material Ingredient Optimization

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to 2010 ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Quality standards: ASHRAE 15 and ASME B31.5:

2.2 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type K or L (ASTM B 88M, Type A or B).

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8/A5.8M.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.

2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Working Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

2.3 VALVES AND SPECIALTIES

A. Thermostatic Expansion Valves: Comply with AHRI 750.

1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F (4.4 deg C).
6. Superheat: Adjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 700 psig (4820 kPa).

B. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in parts per million (ppm).
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).

C. Replaceable-Core Filter Dryers: Comply with AHRI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).

D. Permanent Filter Dryers: Comply with AHRI 730.

1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.

4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).

2.4 REFRIGERANTS

A. ASHRAE 34, R-134a: Tetrafluoroethane.

B. ASHRAE 34, R-407C: Difluoromethane/Pentafluoroethane/1,1,1,2-Tetrafluoroethane.

C. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

2.5 LEED MATERIAL REQUIREMENTS

A. Environmental Product Declarations

B. Multi-Attribute Optimization

C. Raw Material Source and Extraction Reporting

D. Leadership Extraction Practices

E. Material Ingredient Reporting

F. Material Ingredient Optimization

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-134a

A. Suction Lines NPS 1-1/2 (DN 40) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Suction Lines NPS 4 (DN 100) and Smaller NPS 2 to NPS 4 (DN 50 to DN 100) for Conventional Air-Conditioning Applications: Copper, Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with soldered joints.

E. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications:

1. NPS 1-1/2 (DN 40) and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 1-1/2 (DN 40) and Smaller: Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
3. NPS 4 (DN 100): Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-407C

A. Suction Lines NPS 1-1/2 (DN 40) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Suction Lines NPS 4 (DN 100) and Smaller for Conventional Air-Conditioning Applications: Copper, Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with soldered joints.

E. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications:

1. NPS 1 (DN 25) and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 1 (DN 25) and Smaller: Copper, Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
3. NPS 1-1/4 to NPS 2 (DN 32 to DN 50): Copper, Type K (A), annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
4. NPS 4 (DN 100): Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with soldered joints.

3.3 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 1-1/2 (DN 40) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Suction LinesNPS 2 to NPS 3-1/2 (DN 50 to DN 90) for Conventional Air-Conditioning Applications: Copper, Type L (B), drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type L (B), annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications:

1. NPS 5/8 (DN 18) and Smaller: Copper, Type L (B), annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 3/4 to NPS 1 (DN 20 to DN 25) and Smaller: Copper, Type K (A), annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
3. NPS 1-1/4 (DN 32) and Smaller: Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.
4. NPS 1-1/2 to NPS 2 (DN 40 to DN 50): Copper, Type K (A) Type L (B), drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.

3.4 VALVE AND SPECIALTY APPLICATIONS

A. Install diaphragm packless valves in suction and discharge lines of compressor.

B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.

D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.

E. Install a full-size, three-valve bypass around filter dryers.

F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.

G. Install thermostatic expansion valves as close as possible to distributors on evaporators.

1. Install valve so diaphragm case is warmer than bulb.
2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

H. Install safety relief valves where required by 2010 ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:

1. Solenoid valves.
2. Thermostatic expansion valves.
3. Hot-gas bypass valves.
4. Compressor.

K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.

L. Install receivers sized to accommodate pump-down charge.

M. Install flexible connectors at compressors.

3.5 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

K. Install refrigerant piping in protective conduit where installed belowground.

L. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

M. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

O. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

Q. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

3.6 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.

F. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

H. Welded Joints: Construct joints according to AWS D10.12M/D10.12.

I. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.7 HANGERS AND SUPPORTS

A. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:

1. NPS 1/2 (DN 15): Maximum span, 60 inches (1500 mm); minimum rod, 1/4 inch (6.4 mm).
2. NPS 5/8 (DN 18): Maximum span, 60 inches (1500 mm); minimum rod, 1/4 inch (6.4 mm).
3. NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod, 1/4 inch (6.4 mm).
4. NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).
5. NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).
6. NPS 2 (DN 50): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).
7. NPS 2-1/2 (DN 65): Maximum span, 108 inches (2700 mm); minimum rod, 3/8 inch (9.5 mm).
8. NPS 3 (DN 80): Maximum span, 10 feet (3 m); minimum rod, 3/8 inch (9.5 mm).
9. NPS 4 (DN 100): Maximum span, 12 feet (3.7 m); minimum rod, 1/2 inch (13 mm).

D. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2 (DN 50): Maximum span, 10 feet (3 m); minimum rod, 3/8 inch (9.5 mm).
2. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 m); minimum rod, 3/8 inch (9.5 mm).
3. NPS 3 (DN 80): Maximum span, 12 feet (3.7 m); minimum rod, 3/8 inch (9.5 mm).
4. NPS 4 (DN 100): Maximum span, 14 feet (4.3 m); minimum rod, 1/2 inch (13 mm).

E. Support multifloor vertical runs at least at each floor.

3.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.

    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

B. Prepare test and inspection reports.

3.9 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
4. Charge system with a new filter-dryer core in charging line.

3.10 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.

5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

3.11 LEED CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management: Construction Waste shall be managed in accordance with provisions of Section 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Documentation shall be submitted to satisfy the requirements of that section.

END OF SECTION 232300

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round and flat-oval ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.
7. Seismic-restraint devices.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.
3. 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS for additional LEED (Leadership in Energy & Environmental Design) requirements.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.

B. Provide product certificates or other back-up documentation for any product meeting the following LEED credits. Also include material costs, excluding cost of installation, for all materials.

1. Environmental Product Declarations
2. Multi-Attribute Optimization
3. Raw Material Source and Extraction Reporting
4. Leadership Extraction Practices
5. Material Ingredient Reporting
6. Material Ingredient Optimization

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches (1524 mm) in Diameter: Flanged.

D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches (2286 mm) in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches (1830 mm) in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

E. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

G. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Maximum Thermal Conductivity:

a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F (0.039 W/m x K) at 75 deg F (24 deg C) mean temperature.

b. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F (0.033 W/m x K) at 75 deg F (24 deg C) mean temperature.

2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.

2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel aluminum stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
7. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm (12.7 m/s) or where indicated.

9. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches (76 mm).
3. Sealant: Modified styrene acrylic.
4. Water resistant.

5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
11. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive or negative.
12. Service: Indoor or outdoor.
13. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.

5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and shall be rated for10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.7 SEISMIC-RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

B. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

C. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.

D. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

E. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.8 LEED MATERIAL REQUIREMENTS

A. Environmental Product Declarations

B. Multi-Attribute Optimization

C. Raw Material Source and Extraction Reporting

D. Leadership Extraction Practices

E. Material Ingredient Reporting

F. Material Ingredient Optimization

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

B. Install round and flat-oval ducts in maximum practical lengths.

C. Install ducts with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

J. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.

4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet (5 m).

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m)o.c.
2. Brace a change of direction longer than 12 feet (3.7 m).

B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install cable restraints on ducts that are suspended with vibration isolators.

E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.

F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

G. Drilling for and Setting Anchors:

1. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
2. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
3. Set anchors to manufacturer's recommended torque, using a torque wrench.
4. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.6 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

3.8 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

B. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.

a. Velocity 1000 fpm (5 m/s) or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm (5 to 7.6 m/s): Conical tap.
c. Velocity 1500 fpm (7.6 m/s) or Higher: 45-degree lateral.

3.9 LEED CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management: Construction Waste shall be managed in accordance with provisions of Section 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Documentation shall be submitted to satisfy the requirements of that section.

END OF SECTION 233113

SECTION 23 33 00

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Manual-volume dampers.
2. Turning vanes.
3. Duct-mounted access doors and panels.
4. Flexible ducts.
5. Flexible connectors.
6. Duct accessory hardware.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Extruded Aluminum: ASTM B 221, Alloy 6063, Temper T6.

C. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 MANUAL-VOLUME DAMPERS

A. General: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without

vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

1. Pressure Classifications of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.

B. Low-Leakage Volume Dampers: Multiple- or single-blade, opposed-blade design as indicated, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.

1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized, sheet steel.
3. Blade Seals: Neoprene.
4. Blade Axles: Galvanized steel.
5. Tie Bars and Brackets: Galvanized steel.

C. Jackshaft: 1-inch- diameter, galvanized steel pipe rotating within a pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.

1. Length and Number of Mountings: Appropriate to connect linkage of each damper of a multiple-damper assembly.

D. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.3 FIRE SMOKE DAMPERS

A. General: Labeled to UL 555S. Combination fire and smoke dampers shall be labeled for one-and-one-half-hour rating to UL 555.

B. Fusible Link: Replaceable, 165 or 212 deg F rated as indicated.

C. Frame and Blades: 0.064-inch- thick, galvanized, sheet steel.

D. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized, sheet steel; length to suit wall or floor application.

E. Damper Motors: Provide for two-position action.

1. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
2. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.

3. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
4. Nonspring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.

2.4 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch- wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into side strips suitable for mounting in ducts.

C. Acoustic Turning Vanes: Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.5 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. General: Fabricate doors and panels airtight and suitable for duct pressure class.

B. Frame: Galvanized, sheet steel, with bend-over tabs and foam gaskets.

C. Door: Double-wall, galvanized, sheet metal construction with insulation fill and thickness, and number of hinges and locks as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

E. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

2.6 FLEXIBLE CONNECTORS

A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

B. Standard Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized, sheet.

C. Transverse Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 4-3/8-inch- wide, 0.028-inch- thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.

D. Conventional, Indoor System Flexible Connector Fabric: Glass fabric double coated with polychloroprene.

1. Minimum Weight: 26 oz./sq. yd..
2. Tensile Strength: 480 lbf/inch in the warp, and 360 lbf/inch in the filling.

E. Conventional, Outdoor System Flexible Connector Fabric: Glass fabric double coated with a synthetic-rubber, weatherproof coating resistant to the sun's ultraviolet rays and ozone environment.

1. Minimum Weight: 26 oz./sq. yd..
2. Tensile Strength: 530 lbf/inch in the warp, and 440 lbf/inch in the filling.

F. High-Corrosive-Environment System Flexible Connectors: Glass fabric coated with a chemical-resistant coating.

1. Minimum Weight: 14 oz./sq. yd..
2. Tensile Strength: 450 lbf/inch in the warp, and 340 lbf/inch in the filling.

2.7 FLEXIBLE DUCTS

A. General: Comply with UL 181, Class 1.

B. Flexible Ducts, Insulated: Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1-1/2-inch- thick, glass-fiber insulation around a continuous inner liner.

1. Reinforcement: Steel-wire helix encapsulated in inner liner.
2. Outer Jacket: Glass-reinforced, silver Mylar with a continuous hanging tab, integral fibrous-glass tape, and nylon hanging cord.
3. Inner Liner: Polyethylene film.

C. Pressure Rating: 6-inch wg positive, 1/2-inch wg negative.

2.8 ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness.

B. Splitter Damper Accessories: Zinc-plated damper blade bracket; 1/4-inch, zinc-plated operating rod; and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.

D. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and NAIMA's "Fibrous Glass Duct Construction Standards" for fibrous-glass ducts.

B. Install volume dampers in lined duct; avoid damage to and erosion of duct liner.

C. Provide test holes at fan inlet and outlet and elsewhere as indicated.

D. Install fire smoke dampers according to manufacturer's UL-approved written instructions.

E. Install fusible links in fire smoke dampers.

F. Install duct access panels for access to both sides of duct coils. Install duct access panels downstream from volume dampers, fire dampers, turning vanes, and equipment.

1. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting, and maintaining accessories and terminal units.
2. Install access panels on side of duct where adequate clearance is available.

G. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment."

H. Install turning vanes in 90° rectangular elbows.

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 233300

SECTION 23 34 23

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Centrifugal roof ventilators.
2. In-line centrifugal fans.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

B. UL standards: Power ventilators shall comply with UL 705.

1.6 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 CENTRIFUGAL ROOF VENTILATORS

A. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with inlet cone.

B. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

C. Accessories:

1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
2. Bird Screens: Removable, 1/2-inch (13-mm) mesh, aluminum or brass wire.
3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.

D. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- (40-mm-) thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch (40-mm) wood nailer. Size as required to suit roof opening and fan base.

2.2 IN-LINE CENTRIFUGAL FANS

A. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.

B. Direct-Drive Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.

C. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.

D. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.

E. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
3. Companion Flanges: For inlet and outlet duct connections.
4. Fan Guards: 1/2- by 1-inch (13- by 25-mm) mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
5. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.
6. Backdraft dampers: Counterbalanced, parallel blade, mounted in-line of outlet; factory set to close when fan stops.

F. Characteristics:

1. Wheel Type: Backward inclined, forward curved or airfoil.

2. Class: I.
3. Vibration Isolators:

    a. Type: Elastomeric hangers.
    b. Static Deflection: 1 inch (25 mm).

4. Spark Arrestance Class: C.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Install units with clearances for service and maintenance.

C. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

D. Support suspended units from structure using threaded steel rods and spring hangers with vertical-limit stops having a static deflection of 1 inch (25 mm). Vibration-control devices are specified in Section 230548 "Vibration and Seismic Controls for HVAC."

3.2 CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

3.3 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

END OF SECTION 233423

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.
2. Perforated diffusers.
3. Louver face diffusers.
4. Modular core supply grilles.
5. Continuous tubular diffusers.
6. Adjustable bar registers, grilles, registers and grilles.
7. Fixed face registers, grilles, registers and grilles.

B. Related Sections:

1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details;

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Rectangular and Square Ceiling Diffusers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hart & Cooley Inc.
b. Krueger.

c. Price Industries.
d. Titus.
e. Tuttle & Bailey.
f. Or equal.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel or Aluminum where required. Aluminum required in shower areas.
4. Finish: Baked enamel, white.
5. Face Size: 24 by 24 inches (600 by 600 mm).
6. Face Style: Four cone.
7. Mounting: Surface and T-bar.
8. Pattern: Adjustable.

B. Perforated Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hart & Cooley Inc.
b. Krueger.
c. Price Industries.
d. Titus.
e. Tuttle & Bailey.
f. Or equal.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel backpan and pattern controllers, with steel or aluminum face where required. Aluminum required in shower areas.
4. Finish: Baked enamel, white.
5. Face Size: 24 by 12 inches (600 by 300 mm).
6. Duct Inlet: Round or Square.
7. Face Style: Flush.
8. Mounting: Surface or T-bar.
9. Pattern Controller: Four louvered deflector patches.

C. Louver Face Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Price Industries.
b. Titus.
c. Krueger
d. Tuttle & Bailey.
e. Or equal.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel or Aluminum where required. Aluminum required in shower areas.
4. Finish: Baked enamel, white.
5. Face Size: As indicated in drawings.
6. Mounting: Surface and T-bar Snap.

7. Pattern: Adjustable core style.

2.2 HIGH-CAPACITY DIFFUSERS

A. Modular Core Supply Grilles:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Hart & Cooley Inc.
    b. Krueger.
    c. Price Industries.
    d. Titus.
    e. Tuttle & Bailey.
    f. Or equal.

2. Throw: Extended distance for airflow rates.
3. Material: Steel.
4. Grilles per Unit: Four.
5. Finish: White baked acrylic.
6. Border: 1-1/2-inch (38-mm) width with countersunk screw holes.
7. Blades:

    a. Airfoil, individually adjustable horizontally.
    b. Double deflection.
    c. Set in modules.

8. Modules: Removable; rotatable.
9. Mounting: Surface.

2.3 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Hart & Cooley Inc.
    b. Krueger.
    c. Price Industries.
    d. Titus.
    e. Tuttle & Bailey.
    f. Or equal.

2. Material: Steel or Aluminum where required. Aluminum required in shower areas.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Vertical spaced 1/2 inch (13 mm) apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Horizontal spaced 3/4 inch (19 mm) apart.

7. Frame: 1-1/4 inches (32 mm) 1 inch (25 mm) wide.
8. Mounting: Countersunk screw.

B. Adjustable Bar Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Hart & Cooley Inc.
   b. Krueger.
   c. Price Industries.
   d. Titus.
   e. Tuttle & Bailey.
   f. Or equal.

2. Material: Steel or Aluminum where required. Aluminum required in shower areas.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Horizontal spaced 1/2 inch (13 mm) apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Horizontal spaced 3/4 inch (19 mm) apart.
7. Frame: 1-1/4 inches (32 mm) wide.
8. Mounting: Countersunk screw.

C. Fixed Face Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Hart & Cooley Inc.
   b. Krueger.
   c. Price Industries.
   d. Titus.
   e. Tuttle & Bailey.
   f. Or equal.

2. Material: Steel or Aluminum where required. Aluminum required in shower areas.
3. Finish: Baked enamel, white.
4. Face Arrangement: Perforated core.
5. Core Construction: Integral.
6. Frame: 1-1/4 inches (32 mm) wide.
7. Mounting: Countersunk screw.

D. Fixed Face Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Hart & Cooley Inc.
   b. Krueger.
   c. Price Industries.
   d. Titus.

e. Tuttle & Bailey.
f. Or equal.

2. Material: Steel or Aluminum where required. Aluminum required in shower areas.
3. Finish: Baked enamel, white.
4. Face Arrangement: Perforated core.
5. Core Construction: Integral.
6. Frame: 1-1/4 inches (32 mm) wide.
7. Mounting: Countersunk screw.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 23 81 26

SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. For Compressor: One year(s) from date of Substantial Completion.
b. For Parts: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. LG

B. Fujitsu

C. Daikin

D. Or equal

2.2 INDOOR UNITS (5 TONS (18 kW) OR LESS)

A. Wall-Mounted, Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels on front and ends in and discharge drain pans with drain connection.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
3. Fan: Direct drive, centrifugal.
4. Fan Motors:

a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
b. Multitapped, multispeed with internal thermal protection and permanent lubrication.

c. Enclosure Type: Totally enclosed, fan cooled.
d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
f. Mount unit-mounted disconnect switches on exterior or interior of unit.

5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
6. Condensate Drain Pans:

a. Fabricated with one or two percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.

1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
2) Depth: A minimum of 1 inch (25 mm) deep.

b. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.

1) Minimum Connection Size: NPS 1 (DN 25).

c. Pan-Top Surface Coating: Asphaltic waterproofing compound.

7. Air Filtration Section:

a. General Requirements for Air Filtration Section:

1) Comply with NFPA 90A.
2) Minimum Arrestance: According to ASHRAE 52.1 and MERV according to ASHRAE 52.2.
3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.

b. Disposable Panel Filters:

1) Factory-fabricated, viscous-coated, flat-panel type.
2) Thickness: 1 inch (25 mm).
3) Arrestance according to ASHRAE 52.1: 80.
4) Merv according to ASHRAE 52.2: 8.
5) Media: Interlaced glass fibers sprayed with nonflammable adhesive.
6) Frame: Galvanized steel, with metal grid on outlet side, steel rod grid on inlet side, and hinged; with pull and retaining handles.

c. Extended-Surface, Disposable Panel Filters:

1) Factory-fabricated, dry, extended-surface type.
2) Thickness: 1 inch (25 mm).
3) Arrestance according to ASHRAE 52.1: 90.

4) Merv according to ASHRAE 52.2: 8.
5) Media: Fibrous material formed into deep-V-shaped pleats and held by self-supporting wire grid.
6) Mounting Frames: Welded, galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.

2.3 OUTDOOR UNITS (5 TONS (18 kW) OR LESS)

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

    a. Compressor Type: Scroll.
    b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
    c. Refrigerant Charge: R-410A.
    d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
4. Fan: Aluminum-propeller type, directly connected to motor.
5. Motor: Permanently lubricated, with integral thermal-overload protection.
6. Low Ambient Kit: Permits operation down to 45 deg F (7 deg C).
7. Mounting Base: Polyethylene.

2.4 ACCESSORIES

A. Automatic-reset timer to prevent rapid cycling of compressor.

B. Drain Hose: For condensate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Equipment Mounting:

1. Install ground-mounted, compressor-condenser components on grade.

D. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

B. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections in accordance with manufacturers instructions.

B. Remove and replace malfunctioning units and retest as specified above.

C. Prepare test and inspection reports.

3.4 STARTUP

A. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238126

SECTION 23 82 19

VARIABLE REFRIGERANT AIR CONDITIONING SYSTEM

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. The variable capacity, heat pump or heat recovery air conditioning system shall consist of multiple evaporators, a refrigeration distribution system using PID controls, branch selector boxes, and outdoor units. The outdoor unit shall be a direct expansion (DX), air-cooled heat pump or heat-recovery (as indicated on the plans), multi-zone air-conditioning system with variable speed driven compressors using R-410A refrigerant. All zones shall be capable of operating separately with individual temperature controls.

B. Operation of the system shall permit either cooling or heating of all of the fan coil units. Each fan coil or group of fan coils shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface as specified.

1.2 QUALITY ASSURANCE

A. The units shall be listed by Electrical Laboratories (ETL) and bear the cETL label.

B. All wiring shall be in accordance with the National Electric Code (NEC).

C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

D. The outdoor unit will be factory charged with R410A.

1.3 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer’s recommendations.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 WARRANTY

A. The units shall have a manufacturer’s warranty for a period of one (1) year from date of installation. The compressors shall have a warranty of six (6) years from date of installation. All warranty service work shall be performed by factory trained service professionals.

1.6 DESIGN BASIS

A. The HVAC equipment basis of design is Daikin AC. Alternate manufacturers would be LG, Toshiba/Carrier, Mitsubishi or equal.

PART 2 - PRODUCTS

2.1 OUTDOOR UNIT

A. General:

1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator.
2. High/low pressure gas line, liquid and suction lines must be individually insulated between the outdoor and indoor units.
3. The sound pressure level shall be 63 dBA or less at 3 feet from the front of the unit.
4. The system will automatically restart operation after a power failure and will retain all settings, eliminating the need for reprogramming.
5. The unit shall incorporate an auto-charging feature and a refrigerant charge check function.
6. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
7. To ensure the liquid refrigerant does not flash when supplying to the various fan coil units, the circuit shall be provided with a sub-cooling feature.
8. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.
9. The outdoor unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls.
10. The system shall continue to provide heat to the indoor units while in the defrost mode.
11. The system shall continue to provide heat or cooling during change-over of any of the branch selctor boxes.

B. Unit Cabinet:

1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit shall consist of one or more propeller type, direct-drive fans that have variable speed operation via a DC (digitally commutating) inverter.
2. The condensing unit fan shall have 0.32” of external static pressure available.
3. Nominal sound pressure levels shall be 63 dBA or less.

4. The fan motor shall have inherent thermal overload protection and permanently lubricated bearings.

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
4. The fins shall be covered with an anti-corrosion acrylic resin and type E1, hydrophilic film.
5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

E. Compressor:

1. The scroll compressors shall be variable speed PAM inverter to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.
2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G-type”.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be from 100 percent to as low as 6 percent.
5. Each non-inverter compressor shall also be of the hermetically sealed scroll type.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration.
9. Units sized 8-12 ton shall contain a minimum of 2 compressors, units larger than 12 tons shall contain a minimum of 4 compressors. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition.
10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of a Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

F. Electrical:

1. The power supply to the outdoor unit shall be as shown on the equipment schedule.

2. The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable.
3. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.

2.2 INDOOR UNITS: CONCEALED CEILING DUCTED

A. General:

1. Indoor, built-in, ceiling concealed, fan coil units, operable with R-410A refrigerant, shall be equipped with an electronic expansion valve, for installation into the ceiling cavity. The unit shall be constructed of a galvanized steel casing. Computerized PID control shall be used to maintain room temperature within 1°F.

B. Indoor Unit:

1. The indoor unit shall be completely factory assembled and tested. It shall be provided complete with factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an adjustable external static pressure switch.
2. Indoor units shall be above ceiling ducted, wall mount cassette type, ceiling mount cassette type, or below ceiling, horizontal cassette type as scheduled on the plans.
3. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
4. Both refrigerant lines shall be insulated from the outdoor unit.
5. The indoor units shall be equipped with a return air thermistor.
6. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
7. The voltage range will be 253 volts maximum and 187 volts minimum.
8. Switch box shall be reached from the side or bottom for ease of service and maintenance.
9. Fan coil units shall be equiped with factory mounted condensate pumps.

C. Unit Cabinet:

1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be a direct-drive Sirocco type fan with statically and dynamically balanced impeller and high and low fan speeds available.
2. The airflow rate shall be available in high and low settings.
3. The fan motor shall be thermally protected.
4. Ducted fan coils 4 tons and smaller shalled be equiped with DC (ECM) motors with auto CFM adjustment at commissioning. This feature shall adjust the airflow based on the external static pressure.

E. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. A condensate pan shall be located under the coil.
4. A thermistor shall be located on the liquid and gas line.

F. Condensate Pumps:

1. The units shall be provided with condensate pumps as required. Condensate pumps shall be powered from the associated fan coil unit.

2.3 DDC CONTROLS

A. The Variable Refrigerant Volume system shall be supplied with factory mounted DDC controllers on each fan coil unit and on the condensing units. The controls shall communicate seamlessly to provide precise temperature control and minimize energy consumption.

B. Advanced Remote Controller

1. The Advanced Remote Controller shall be capable of controlling a group of up to 16 indoor units. The Advanced Remote Controller shall only be combined in the same group with another Advanced Remote Controller with up to two remote controllers per group.
2. The Advanced Remote Controller shall connect using two-wire, stranded, non-shielded, non-polar control wire to the indoor unit and shall require no addressing.
3. The Advanced Remote Controller shall be approximately 4.75” x 4.75” in size with a backlit 2.75” x 1.75” LCD display. Display information shall be selectable from English, French, or Spanish. Day of the week as well as time of day configurable for 12/24 hour clock shall be displayed. Display of temperature information shall be configurable for Fahrenheit or Celsius. The controller shall be able to display room temperature in one degree increments with a range of 0 - 176oF / 0-80oC.
4. The Advanced Remote Controller shall control the following grouped operations: On/Off, Operation Mode (Cool, Heat, Fan, Dry and Auto), independent Cooling and Heating setpoints in the Occupied mode and independent Cooling Setup and Heating Setback setpoints in the Unoccupied mode, fan speed, and airflow direction and have the ability to individually prohibit controller buttons. The controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating in the occupied period.
5. The Advanced Remote Controller shall support schedule settings with selectable weekly pattern options of 7-day, Weekday + Weekend, or Weekday + Saturday + Sunday. The schedule shall support unit On/Off with independently settable Cooling and/or Heating setpoints when unit is on (occupied), or Setup and/or Setback setpoints when unit is off (unoccupied). A minimum of 5 operations shall be schedulable per day in 1-minute increments.
6. The Advanced Remote Controller shall support auto-changeover mode for both heat pump and heat recovery systems allowing the optimal room temperature to be maintained by automatically switching the indoor unit’s mode between Cool and Heat according to the room temperature and temperature setpoint. Changeover to cooling mode shall occur at cooling setpoint + 1oF (0.5oC). Changeover to heating mode shall occur at heating setpoint - 1oF (0.5oC).

7. The Advanced Remote Controller shall support an Auto Off timer for temporarily enabling indoor unit operation during the unoccupied period. When the Off Timer is enabled and after the unit is manually turned on at the remote controller, the controller shall shut off the unit after a set time period. This period shall be configurable in the controller menu with a range of 30-180 minutes.
8. The room temperature shall be sensed at either the Advanced Remote Controller or the Indoor Unit return air temperature sensor (or remote mount sensor) dependent on the Field Setting configured through the remote controller.
9. The Advanced Remote Controller shall display an error code in the event of system abnormality/error. The controller shall also display the following system temperatures to assist service personnel in troubleshooting: Return Air Temperature, Liquid Line Temperature, Gas Line Temperature, Discharge Air Temperature (depending on unit), Remote Controller Sensor Temperature, and Temperature used for Indoor Unit Control.
10. The Advanced Remote Controller shall support the functions listed below.

Advanced Remote Controller	
Item	Description
LCD Display	Backlit with auto-off after 30 seconds. Contrast adjustment. Capable of two display modes: Standard, which displays Mode, Setpoints, and Fan Speed in large font as well as system status icons, and Detailed which adds Room Temperature (0-176°F/0-80°C range in 1° increment), Airflow Direction, Date and Time.
Menus	The following menus shall be available: Main for basic user operation, Service for installation and commissioning, and Maintenance for troubleshooting.
On/Off	Run and stop operation for an indoor unit or group of indoor units.
Mode	Switches between Cool/Heat/Fan/Dry/Auto.
Occupied Cool/Heat Setpoints	Range: 60-90°F (16-32°C) in 1° increment.
Unoccupied Setup/Setback Setpoints	Range: 40-95°F (5-35°C) in 1° increment.
Fan Speed	Up to 3-speed depending on type of indoor unit.
Air Flow Direction	Air flow direction angles 100 percent-80 percent-60 percent-40 percent, Swing, depending on indoor unit model.
Weekly Schedule	Patterns: 7-Day, Weekday + Weekend, Weekday + Saturday + Sunday Up to 5 On/Off operations per day with the ability to set new individual Occupied Cooling and/or Heating setpoints or Unoccupied Setup and/or Setback setpoints per operation

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install seismic restraints.

D. Install compressor-condenser components on k.

E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 sections. Drawings indicate general arrangement of piping, fittings and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Ground equipment according to Division 26.

D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Inspect, test, and adjust field-assembled components and equipment installation, including connections according to manufacturers instructions.

B. Perform the following field tests and inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 238219

Section 26 05 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions and Division 1 are part of this section and the contract for this work and apply to this section as fully as if repeated herein. This section, 260500, applies to all Division 26 categories.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 EXPLANATION OF DRAWINGS

A. These construction documents are intended to be diagrammatic and reflect the scope, quality, and character of the work to be performed; all miscellaneous materials and work required for a complete and operational system, though not specifically mentioned, shall be furnished and installed by the Contractor.

B. The Contractor shall confirm sizes, dimensions, weights and locations of all devices, light fixtures, and equipment prior to installation. Dimensioned architectural drawings shall take precedence over diagrammatic layouts shown on these contract documents.

C. The specifications and the drawings are an integral document and shall be considered complementary to each other. In the case of a conflict between the specifications and the drawings, the more constricting condition shall be enforced.

D. The Contractor shall be responsible for reporting any discrepancies, errors, or omissions noted prior to bid.

E. It is the intent of the drawings to indicate schematic routing and placement of devices, fixtures, equipment and conduit. Equipment or devices requiring a precise location shall be dimensioned on other trade documents (architectural, mechanical, etc.). Offsets, elbows, or extensions shall be furnished and installed by the Contractor as necessary to avoid structure, piping, and clearances and to provide a complete and workmanlike installation.

1.3 QUALITY ASSURANCE

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications and supplements, of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor's Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner's Representative by the Contractor.

C. All items shall be listed by Underwriter’s Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer’s requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the Contractor.

1.4 SUBMITTALS

A. Shop drawings for materials, equipment, devices, fixtures, and systems shall be submitted by the Contractor for review within 30 days after award of the contract. In addition to the requirements for submittals stated herein, the Contractor shall be responsible for compliance with the requirements of Division 1.

B. The Contractor shall bear the responsibility for any materials installed which were not submitted for review or not installed in compliance with the review comments and the contract documents.

C. Verbal modification of submittal documents or changes to the requirements of the contract documents shall not be acceptable. All submittal material must be documented in a written format.

D. All submittal packages must be submitted at one time and in accordance with the specification section appropriate for the material. All packages must be identical and clearly labeled indicating the specification section, project name, submittal date, Contractor's name, Engineer's name, preparer's name and submission version (first submission, resubmittal #1, etc.).

E. Product catalog cutsheets and descriptive literature shall be cross-referenced to the specification section by paragraph.

F. All submittal packages shall be permanently bound in brochure or booklet format. A minimum quantity of six (6) submittal booklets shall be provided by the Contractor; additional printed copies may be required if so noted. Electronic copies of completed submittal packages, furnished on a CD-ROM in pdf format, may be furnished in lieu of printed copies.

G. Materials which bear a certification or approval of a testing agency, performance criteria, society, agency, of other organization shall be submitted with all labels identified.

H. The submittal shall be complete and with catalog data and information properly marked to show, among other things, materials, capacity and performance data to meet the specified requirements.

I. Incomplete submittals will be rejected at the discretion of the reviewing Engineer.

J. Review of the submittal is only for general conformance with the contract documents. The Contractor is responsible for confirmation and coordination of dimensions, quantities, sizes, fabrication, installation methods, and for coordination of work of other trades with electrical work.

K. Detailed working drawings shall be prepared and submitted showing items which are to be fabricated including transformer mounting racks, unistrut mounting frames, equipment room layouts, pull boxes, splice boxes, gutters, etc.

L. Minimum scale for submitted drawings shall be 1/8". Details shall be drawn to 1/4" scale. All drawings shall be 8.5"x11" or larger.

M. Submittal brochures shall be complete and descriptive of the type, make, manufacturer, application, quantity, performance, capacity, ratings, options, dimensions, clearances, weights, nameplate data, special installation requirements, mounting method, NEMA type, NEMA class, environmental restrictions, layout requirements or other information as may be necessary for review of the material.

N. Submittal brochures for switchgear shall include, as a minimum, the following: singleline diagrams; fault current ratings of buses and devices; device identification, ratings, layout and characteristics; dimensions; circuit identification; identification label type and method of affixing; mounting; conduit entry point and quantities; NEMA enclosure type; and additional data as required for a complete review.

O. Submittal brochures for lighting systems shall include, as a minimum, the following: manufacturer; detailed drawing or photograph; dimensions; lamp data; ballast data; certified photometric data from a third-party testing agency; U.L. label listing; fixture number or identification from the drawings; finish color and material; mounting equipment; socket type and rating; environmental ratings (damp location, watertight, explosion-proof, etc.); voltage; input wattage; and additional information as necessary for a complete review.

P. The Contractor shall be responsible for all aspects of substitutions of material including any additional cost or delay incurred as a result of the substitution. The Contractor shall coordinate all substitutions with other trades, verify code compliance, verify clearances, photometric performance, appearance, suitability, constructability, and availability of the material prior to submitting the substitution for review. The Contractor shall bear the responsibility of any increased costs to other trades which are directly related to the substitution.

1.5 MATERIAL HANDLING

A. The Contractor shall deliver all equipment and material to the site in the manufacturer's original packaging without seals broken.

B. The Contractor shall handle, store, protect, and unpack all equipment and materials in accordance with the manufacturer's recommendations.

C. The Contractor shall inspect the equipment and materials in a timely manner to ensure the completeness and appropriateness of the shipment.

D. The Contractor shall immediately replace damaged or defective equipment or materials with identical new equipment or material at no cost, inconvenience, or delay to the Owner.

1.6 EXISTING CONDITIONS

A. The Contractor shall verify all existing conditions prior to bid and include all costs associated with the existing conditions in bid.

B. The Contractor shall match the finish and appearance of all existing conditions where constructing new work adjacent to existing surfaces or equipment.

C. Coordinate with the Owner’s Representative for all ongoing projects or the work of other trades which may affect the Contractor’s work. Verify Owner schedule requirements for special or standard events which may impact the Contractor’s work.

D. Coordinate work to be performed in occupied areas and comply with the Owner’s requirements such that the Owner’s work or ongoing activities are not disrupted by the Contractor. Verify the need for work to be performed during premium hours, evenings, weekends, or holidays prior to bid and include all costs in bid. Bring to the Owner’s attention the need and locations for all disruptive work prior to commencement of work.

1.7 UTILITY COMPANY REQUIREMENTS

A. The contractor shall contact the serving utility company for all utility system requirements prior to commencement of work. Utility work shall include electric power, telephone, data, fiber optic cable, cable television or other utilities as may require connections as a part of this contract. Coordinate and comply with all serving utility company requirements, designs, and schedules.

B. The utility information depicted on the contract documents is for bidding purposes only and shall not be used for construction purposes. All construction shall be performed according to engineered documents provided by the serving utility company. The Contractor shall obtain and coordinate with utility company requirements as a part of this contract and furnish and install all work as a part of this contract.

C. Verify all connection points, routing, and requirements with the serving utility company prior to commencement of work and coordinate final requirements with other trades.

D. The Contractor shall be responsible for all costs associated with failure to contact or coordinate with utility company requirements.

1.8 TEMPORARY CONSTRUCTION UTILITY REQUIREMENTS

A. Power, telephone or other temporary construction utility services required by the Contractor shall be the responsibility of the Contractor.

B. Arrangements for temporary construction utility services shall be made by the Contractor in coordination with the Owner's Representative and the serving utility company.

1.9 CONTINUITY OF SERVICE

A. The Contractor shall coordinate all shutdowns, outages, and service interruptions with the Owner's Representative. Electrical shutdowns shall be kept to the minimum number necessary to complete the work.

B. The Contractor shall coordinate all work done on overtime or premium time with Owner's Representative prior to commencement of work.

C. All work performed in or through occupied spaces, or other work disruptive to existing occupants shall be considered as performed during premium time or as overtime for the purposes of the bid; include all costs in bid.

D. The Contractor shall notify Owner's Representative of all shutdowns or disruptive work a minimum of 72 hours prior to commencement of work. The Contractor shall obtain written approval from the Owner’s Representative prior to commencement of work.

E. The Contractor shall provide all necessary temporary power, including temporary power generation, to accommodate shutdowns and minimize disruption of the Owner’s activities.

F. The Owner reserves the right to provide emergency repairs or temporary power to maintain service continuity at the Contractor's cost in the event Contractor fails to provide adequate service continuity.

1.10 RECORD DOCUMENTS

A. The Contractor shall prepare as-built documents depicting all revisions to branch circuits, conduit routing, equipment, panel schedules, lighting control schedules, or materials. Drawings shall be in AutoCAD .dwg format and Adobe .pdf formats. Contractor shall provide (1) full-size hard copy print and (1) CD-ROM of all as-built drawings and files. Hand-drawn or "red-line" drawings shall not be accepted. Drawings shall be legible, reproducible, and properly identified such they may be used as a reference for maintenance or construction.

B. The Contractor shall provide a minimum of three copies of the operation and maintenance manuals to the Owner's Representative at the completion of the project. Each copy shall be bound in a three-ring binder and labeled indicating: the project name; system name; Contractor's name, telephone number, and contact person; and Owner's name. The Contractor shall provide the following minimum information within each manual:

1. List of the Subcontractors performing work on the system including contact names, telephone numbers, and email addresses.
2. Routine and emergency service contact names, telephone numbers, and email addresses for each system.
3. Description of system operation.
4. Single line diagrams and control wiring diagrams.
5. Detailed product literature with technical information.
6. Local factory representative contact name, telephone number, and email address.
7. Sequence of starting, shutdown and operation.
8. Installation instructions and safety requirements.
9. Maintenance schedule, testing instructions and performance parameters.
10. Parts list including recommended spare parts.

1.11 GUARANTEE

A. All electrical work, materials and equipment provided under this contract shall be guaranteed for a period of one year from the date of acceptance of the work by the Owner. Any failures, problems, or deficiencies experienced during this period due to defective materials or faulty workmanship shall be immediately corrected by the Contractor without cost to the Owner. The Contractor shall be responsible for all damages to the Owner's facility, production, or work product due to deficiencies in the electrical system. Equipment guarantees in excess of one year shall not be superseded by this guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall be new, of prime quality, listed as suitable for the application, and bear factory-applied U.L. labels.

B. Materials shall be currently in production and shall be supported by spare parts, repair service, maintenance, and factory technical support.

C. Materials of one assembly (switchboards, substations, motor control centers, etc.) shall be of one manufacturer unless specifically stated otherwise in the contract documents.

D. Provide wire marker on each conductor in electrical panel pull box, outlet, and junction box. This includes all disconnects an connections. *If more than one neutral conductor is present, mark each related circuit and panel number.

E. Label outside of all cover plates of wiring devices and junction boxes with circuit and panel number. Each branch circuit device cover plate will be labeled (engraved or silk screen) to indicate the branch circuit and panel number. Devices will include, but not be limited to, the following: toggle switches, dimmer switches and receptacle.

F. All devices are to have clamp style side/ back connections for stranded wire only. All receptacles shall be pigtailed out so only one Color wire, a neutral wire, and a ground wire is connected to the back of the receptacles.

G. All receptacles and switches on emergency power will be RED.

H. All receptacles in public areas shall be tamper-proof.

a. Hubbell - HBL 8300SGA

b. Decorator Type DR20TR

I. Name plates: Furnish and install a minimum size of 1” high and 3” wide by 3/32” thick matte white (for normal power) and red (for emergency power) laminated phenolic nameplates with 1/4” white characters engraved in the plastic for all items of electrical equipment including, but not limited to switchboards, panel boards, automatic transfer switches, motor control centers, feeder circuit breakers, relays, time switches, disconnect switches, exposed pull or junction boxes, and all control equipment. Name plates will be attached with 2 cadmium-plated screws. Adhesive attachment will not be acceptable. Punch strip tape type name plates with card holders in any form are prohibited.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. All work shall conform to National Electrical Contractors Association standards of installation and the requirements of the manufacturer, Division 1, Division 16, and the Owner's Representative.

B. The Contractor shall field-verify all dimensions and coordinate dimensions with equipment sizes and locations.

C. The Contractor shall coordinate and install all penetrations, openings, slots, chases, or sleeves as necessary for the routing and installation of raceways, conductors, or equipment. The Contractor shall provide approved fire sealant to maintain fire ratings at all penetrations.

D. The Contractor shall coordinate the placement and sequence of installation of all mounting bolts, conduits, sleeves, etc. which are to be set in poured-in-place concrete slabs, concrete walls, and post-tension slabs per the structural drawings.

E. The Contractor shall verify and coordinate all equipment points of connection, voltages, wiring requirements, disconnecting means, fuse sizes, overcurrent protection, etc. with the equipment supplier. The Contractor shall immediately notify the Engineer of any discrepancies with the construction documents.

F. The Contractor shall install access panels in walls or ceilings in coordination with the Architect for all junction boxes or electrical equipment that require access.

G. All equipment shall be installed plumb, parallel, or orthogonal to structure and in a neat orderly fashion. All material shall be accessible for maintenance, inspection, servicing or replacement.

H. Verify final locations of devices, equipment, and fixtures during the rough-in phase with dimensioned architectural drawings, fabrication drawings, or other space planning requirements included in the contract documents.

I. The Contractor shall coordinate and arrange for the proper sequence of construction including scheduling of long-lead items, shutdowns, work of other trades, and Owner-scheduled events.

J. The Contractor shall provide adequate and qualified supervision for the work performed; no work shall be performed without the supervision of a representative of the Contractor.

K. The Contractor shall coordinate and cooperate with all other trades for a successful completion of the project.

3.2 SEISMIC BRACING

A. The Contractor shall seismically brace all equipment in accordance with requirements of the California Code of Regulations, Title 24, Seismic Design Category D and provide certification of seismic compliance upon request, including structural calculations as required.

3.3 CUTTING AND PATCHING

A. The Contractor shall provide cutting and patching as required to install the electrical system in this contract.

B. Coordinate the schedule of all cutting such that the work may be performed in an expeditious manner with minimum inconvenience to the Owner.

C. Remove or cut structures or materials as necessary for demolition prior to the installation of new electrical work.

D. The Contractor shall protect all surfaces, structure, furnishings, and finishes not directly affected by cutting or patching.

E. Provide dust and moisture barriers as required during cutting and prior to patching openings.

F. All penetrations through roofs shall be performed per architectural requirements, including compliance with the roofing manufacturers' requirements.

G. Patching shall be performed with materials which exactly match the adjacent surfaces in color, texture, character, and appearance.

H. All patches must maintain the fire ratings of the original surface and shall be sealed with a U.L. listed and Fire Marshal approved sealant.

3.4 COMMISSIONING

A. The Contractor shall initiate start up of all electrical equipment including operation of all devices, switches, generators, transfer switches, overcurrent protection, disconnect switches, etc. to verify normal operation of all moving parts and electrical performance.

B. The Contractor shall test, adjust, aim, align, label, clean and complete all systems prior to acceptance by the Owner's Representative.

C. The Contractor shall demonstrate that all systems operate within the manufacturer's recommended performance characteristics, the electrical construction documents, system requirements, and Owner requirements.

D. The Contractor shall test each system per the manufacturer's requirements and shall perform the following system tests:

1. Inspect cables for physical damage and proper connection.
2. Torque test cable connection and tighten in accordance with termination manufacturers recommendations.
3. Infrared scan all connections under loaded conditions and provided color printed images.
4. Insulation resistance test of each cable.
5. Inspect ground system connections.
6. Voltage drop tests on the main grounding electrode of system.
7. Determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral points.

8. Check rated voltage and phase balance at all equipment, motors and selected devices at full load conditions. Measure no load voltage conditions at each location.
9. Furnish all material, equipment, instruments and labor as required to complete testing.
10. Provide all test results properly bound in a three-ring binder.

3.5 TRAINING

A. Furnish at least one copy operating instructions from the manufacturer for all electrical equipment to the Owner's Representative. Instructions shall be clean, legible, and properly bound in a three-ring binder.

B. The Contractor shall provide training for the Owner’s staff as directed by the Owner's Representative for a minimum of one man-day (eight hours).

C. Provide classroom training by a qualified instructor for the operation, installation, and maintenance of designated equipment or systems including, but not limited to, generation systems, transfer switches, uninterruptible power supplies, energy management systems, lighting control systems, power distributions systems, and other systems which may require instruction.

3.6 CLEANING

A. Contractor shall clean all equipment, panelboard interiors, conduit interiors, fixtures, devices, etc. of all extraneous paint, drywall mud, overspray, dust, dirt, debris, trash, grease or markings. All cleaning shall be performed by the Contractor in accordance with the appropriate manufacturer’s recommendations.

END OF SECTION 260500

SECTION 26 05 19

WIRE AND CABLE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc.(UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the UL label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Conductor materials and stranding.
2. Connector and termination materials.
3. Installation materials and methods.
4. Termination materials and methods.

PART 2 - PRODUCTS

2.1 Conductors shall be copper; conductors size #12AWG and smaller shall be solid, conductors size #10AWG and larger shall be stranded. Conductors shall be minimum size #12AWG for power and lighting circuits; control circuits shall use a minimum conductor size of #14AWG.

2.2 Insulation shall be type THW or THHN/THWN for all branch circuits up to and including size #2AWG. Insulation for conductors over size #2AWG shall be XHHW.

2.3 Jackets shall be nylon or PVC material.

2.4 All cables shall be UL listed for the application.

2.5 All conductors shall be installed in conduit in the field, unless specifically noted otherwise in these documents. Type AC and type NM cable is not acceptable; type MC cable may be used where specifically noted for purposes of flexibility, maintenance, or ease of installation but shall not be used without explicit permission and direction of the Engineer.

2.6 Multi-conductor flexible cords shall be types SO, SJO, STO, or SJTO.

2.7 Electrical connectors shall be UL listed and suitable for the conductor material being connected and rated appropriately. Connectors shall be solderless helical metal spring pressure type for conductors #10AWG and smaller. Connectors shall be compression type for conductors #8AWG and larger.

2.8 All wiring will be stranded, copper THHN type, including all #12 A.W. wire except where MC is used in accordance with section 1.2.3.

2.9 Minimum wiring size will be #12 A.W.G. stranded.

2.10 One neutral for every one circuit pulled. No sharing on neutrals wires anywhere.

PART 3 - EXECUTION

3.1 All wiring methods shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Conductors shall be installed in clean raceways using nylon cord, polypropylene cord, hemp rope, or other material which will not damage the conductors or conduit. Do not use metal fish tape to pull conductors. Use a listed cable pulling lubricant when necessary for pulling.

3.3 Conductors shall be pulled into conduit simultaneously so as to not damage conductors during pulling.

3.4 Conductors installed at outlets and switches shall have a minimum of 6" pigtail left in the box for future connections. All conductors not connected to devices shall be terminated with splice caps and tape.

3.5 Conductors shall be terminated such that no copper material is exposed. Conductors shall be trained and labeled at terminations in a neat and workmanlike manner.

3.6 All terminations shall be mechanically sound, featuring helical twisting of the terminating conductors prior to the application of an electrical connector. The electrical connector shall not be used for the mechanical connection of the conductors.

3.7 All terminations shall comply with the manufacturer’s installation and torquing requirements.

3.8 Splices on conductors #10AWG and smaller shall be made with splice caps twisted onto the conductors. Tape all splices.

3.9 Splices on conductors #8AWG and larger shall be made with pressure connectors and terminal lugs. Where exposed to water, damp air, or moisture splices shall be watertight.

3.10 Splices shall be not be made in feeders; splices to branch circuits shall not be made within panelboards or similar enclosures.

3.11 When combining homeruns, the Contractor shall derate all conductors per NEC requirements including reducing the conductor ampacity and using high temperature insulation where necessary. Conduit sizes shall be adjusted by the Contractor, per NEC requirements, for any conductor revisions.

3.12 The Contractor shall provide a code-sized insulated grounding conductor, in addition to the feeder conductors indicated on the drawings, for all feeder circuits.

3.13 Conductors shall be color-coded as follows:

208Y/120V	Phase	480Y/277V
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

3.14 Where tape or labels are used for color-coding, apply material at each end of the conductor, at all splices, within all boxes, and at all terminations.

3.15 Where color other than black is not an integral part of insulation use 3M No. 35 tapes in the same color code to identify both ends of conductors No. 6 and larger. Use other colors as required to identify control or other special circuit. Ground conductor will have green insulation for 1/0 or smaller conductors, green tapes on other colors of insulation are NOT acceptable. All neutral wires shall be white with phase stripe running along entire length.

END OF SECTION 260519

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 SCOPE

A. Permanently and effectively ground conduit systems, supports, cabinets, switchboards, equipment cases, motor frames, lighting standards, landscape lighting, etc., and system neutral conductors per National Electrical Code.

B. Grounding details, symbols and singlelines shown on plans are schematic only. If additional equipment, such as ground rods, clamps, conductors, etc., is required per National Electrical Code furnish and install without additional cost to Owner.

1.3 QUALITY ASSURANCE AND STANDARDS

A. The latest revision of standards listed below form an integral part of this specification.

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor's Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)

B. Furnish products listed by Underwriters Laboratories, Inc. as suitable for purposes specified and shown.

1.4 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review.

B. Manufacturer's data on grounding and bonding products and associated accessories.

1.5 ACCEPTABLE MANUFACTURERS

A. Burndy Corporation

B. Cadweld Division

C. Crouse-Hinds

D. Thomas and Betts Corporation

E. Okonite Company

F. Tecto Weld

PART 2 - PRODUCTS

2.1 GROUNDING MATERIAL

A. Rod Electrode: Material to be copper clad steel rod, 3/4 inch diameter with minimum 10 feet length.

B. Mechanical Connectors: Material shall be copper and of sound continuity when installed.

C. Exothermic Connectors: Material shall be of low emission, electric-start type and of sound continuity when installed.

D. Bare Ground Conductors

1. Conductor shall be 7-strand annealed copper.
2. Individual members of stranded conductor shall meet the requirements of ASTM B-3.
3. Stranded conductors shall be assembled in accordance with the requirements of ASTM B-8.

E. Insulated Conductor (Equipment grounding conductor)

1. Size in accordance with NEC Article 250-95 unless otherwise shown as oversize.

F. Grounding Well Components

1. Well Pipe: Material shall be 8 inch diameter by 24 inch long concrete pipe with belled end.
2. Well Cover: Material shall be cast iron with the text "GROUND" embossed on cover.

G. Ground Bus Bar

1. ASTM B187, 98% conductivity copper bus bar, size 4 inches wide by 1/4inch thick by 24 inches long.

H. Terminal Lugs

1. For 4/0 AWG and smaller conductors: Copper compression lugs.
2. For 250kcmil and larger: Aluminum mechanical lugs.

I. Bonding Plates, Connectors, Terminals and Clamps

1. Bonding Plates, Connectors, Terminals and Clamps: Provide electrical bonding plates, connectors, terminals, lugs and clamps as recommended by bonding plate, connector, terminal and clamp manufacturers for indicated applications.

J. Jumpers

1. Copper braided or leaf-type flexible jumper, size as necessary.

K. Bus Bar Insulators

1. Fiberglass reinforced polyester insulator with 2 inch diameter threaded holes at both ends for bus bar installation.

L. Electrical Grounding Connection Accessories

1. Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, welding materials, bonding straps, as recommended by accessories manufacturers for type service indicated.

M. Field Welding

1. Field Welding: Comply with AWS Code for procedures, appearance, and quality of welds; and for methods used in correction welding work. Provide welded connections where grounding conductors connect to underground grounding and plate electrodes.

N. Grounding Resistors

1. Provide a low-resistance grounding resistor in compliance with the latest IEEE-32 standard.
2. Temperature rise shall not exceed 760 degrees C above an ambient temperature of 30 degrees C for ten-second duration.

3. Neutral grounding relays shall be set to protect the resistor and clear the fault within ten-seconds.
4. For resistors above 600V, an applied high potential test shall be performed equal to 2.25 times the rated voltage, plus 2000 volts.
5. Grounding resistors shall be UL or CSA listed and labeled.

PART 3 - EXECUTION

3.1 GENERAL

A. Install electrical grounding and bonding systems as indicated, in accordance with manufacturer's instructions and applicable portions of NEC, NECA's Standard of Installation, and in accordance with recognized industry practices to ensure that products comply with requirements.

B. Coordinate with other electrical work as necessary to interface installation of electrical grounding and bonding system work with other work.

C. Ground each separately-derived system neutral to nearest cold water piping, service entrance equipment grounding electrodes, and electrically continuous building steel.

D. Connect together system neutral, service equipment enclosures, electrically continuous building steel, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

E. Apply corrosion-resistant finish to field-connections, buried metallic grounding and bonding products, and places where factory applied protective coatings have been destroyed, which are subjected to corrosive action.

3.2 GROUND INSTALLATION

A. Equipment Grounding Conductor

1. Provide separate, insulated conductor within each feeder and branch circuit raceway including lighting circuits.
2. Terminate each end on suitable lug, bus, bushing, or device.

B. Motors or equipment rated at 480V shall have bonded ground jumpers from feeder conduit to motor frame.

C. Grounding bushing shall be used wherever conduits are grounded.

D. Ground the electrical service system neutral at service entrance equipment to the grounding electrode system.

E. Install rod electrodes at locations indicated.

F. Provide grounding well pipe with cover at rod locations where indicated. Install well pipe top flush with finished grade.

G. Install products in accordance with manufacturers' instructions.

H. Use mechanical connections in above ground and accessible locations and use exothermic connectors in underground and inaccessible locations.

I. Provide bonding to meet Regulatory Requirements. Include bonding of metallic gas and sprinkler piping systems.

J. Install ground clamps specifically designed for grounding purposes. Where grounded conductor is in conduit, use ground clamp which grounds both conductor and conduit. Strap metal is not acceptable for grounding and bonding.

K. All raceways will include a full size green insulated ground wire terminated at each outlet box, device enclosure, etc. and connected back at the panel boards, switchboards or cabinet on the appropriate ground bus.

L. The green insulated ground (bond) wire will be spliced together within the outlet box. A green insulated bonding jumper will be provided from the splice to the box body. Attachment to the box body will be provided using a tapped #10 -32x 3/8" screw minimum. A green insulated bonding jumper will be provided from the splice to the receptacle ground screw even with self grounding receptacles.

3.3 ISOLATED GROUND INSTALLATION

A. Provide isolated grounding conductor for circuits supplying isolated ground receptacles. Ground conductor will be sized per NEC unless otherwise noted to be of larger size.

B. Isolated ground conductor shall be routed through panel and to transformer ground for 208V or 120V systems. Isolated ground shall be routed to distributed rod electrode for 480V or 277V systems.

3.4 GROUND RESISTANCE TESTING

A. Grounding electrode resistance testing shall be accomplished with a ground resistance direct reading single test meter utilizing the fall-of-potential method and two reference electrodes. Perform test prior to interconnection to other grounding systems. Orient the concrete-encased ground electrode to be tested and the two reference electrodes in a straight line spaced fifty (50) feet apart. Drive the two reference electrodes five (5) feet apart.

B. Maximum grounding system resistance to be 5 ohms for secondary systems. Install additional ground rods as needed to achieve a resistance of 5 ohms.

C. Test results shall be provided in writing and shall show temperature, humidity and condition of the soil at the time of the tests.

END OF SECTION 260526

SECTION 26 05 29

HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Support materials
2. Attachment and anchor materials
3. Installation materials and methods

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Cooper B-Line, Inc.; a division of Cooper Industries.
    b. Thomas & Betts Corporation.
    c. Unistrut; Tyco International, Ltd.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following and shall be compatible with all building surfaces and materials:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and GRC as required by the NEC. Minimum rod size shall be 3/8 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

END OF SECTION 260529

SECTION 26 05 33

RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Raceway materials
2. Fitting materials
3. Installation materials and methods

PART 2 - PRODUCTS

2.1 RIGID GALVANIZED STEEL (RGS) CONDUIT

A. Continuous hot-dipped galvanized manufactured per UL and ANSI requirement.

B. Rigid aluminum conduit is not acceptable.

C. Conduit bodies for use with steel conduit, rigid or flexible, shall be manufactured per UL requirements and shall be cast metal with gasketed closures.

D. Fittings for RGS conduit shall be malleable iron or forged steel with cadmium or zinc coating.

E. Union couplings for joining rigid conduit at intermediate runs shall be of the same material as the conduit. Couplings shall be threaded concrete-tight to permit completing conduit runs when neither conduit can be turned and to permit breaking the conduit run at the union.

F. Set screw connectors or threadless type are not acceptable.

G. All conduit in coastal or industrial areas to be PVC coated.

H. Minimum raceway size shall not be less than ¾".

2.2 ELECTRICAL METALLIC TUBING (EMT)

A. Conduit shall be cold rolled zinc coated steel and manufactured per UL and ANSI requirements.

B. Fittings for EMT shall be watertight steel or malleable gripping ring compression type.

C. Pressure cast material for nuts of compression ring type fittings and set-screw connections are not acceptable.

D. All wiring inside the building will be in E.M.T. conduit.

E. All E.M.T. connector, coupling, and other fittings will be steel compression type.

F. MC and BX will only be allowed from local feeder boxes; all home runs will be ran in E.M.T.

G. Minimum raceway size shall be ¾".

2.3 ELECTRICAL NON-METALLIC TUBING (ENT)

A. Conduit shall be manufactured in accordance with NEMA TC13 standards and shall be UL listed.

B. Fittings for ENT shall be snap-on type threaded male adapters and locknuts.

C. Minimum raceway size shall be ¾".

2.4 FLEXIBLE METALLIC CONDUIT

A. Flexible conduit shall bear the UL label and be zinc coated steel.

B. Fittings for flexible metallic conduit shall be steel or malleable iron. Fittings shall clamp to conduit securely.

C. Screw in type, sheet metal or set-screw type fittings are not acceptable.

D. Only on motor connection and fixture tails, not over 6 feet in length.

E. All flexible conduits will have a green ground wire. It will only be used for motor connections, fixture tails, or used in existing walls (6" or less). Non-metallic or sealtite will be used in damp locations and machinery rooms.

F. Home runs will be a minimum of ¾"conduit. ½" can be used to supply a single termination (e.g. conduit going from switch box to single light fixture).

G. Minimum raceway size shall not be less than ¾".

2.5 LIQUID TIGHT FLEXIBLE CONDUIT

A. Conduit shall be manufactured in accordance with UL and ANSI requirements. Conduit shall

be approved for grounding and compatible with approved fittings. Flexible steel conduit shall be hot dipped galvanized with extruded PVC covering manufactured per UL requirements.

B. Fittings shall be liquid tight type with body and gland nut of steel or malleable iron with provisions for grounding flexible conduit to fittings.

C. Minimum raceway size shall be ¾".

2.6 POLYVINYL CHLORIDE (PVC) CONDUIT

A. PVC shall be constructed of a virgin homopolymer PVC compound and be manufactured according to NEMA and UL specifications. PVC conduit shall be Schedule 40 or 80.

B. All conduits in the ground will be P.V.C. schedule #40, (minimum) ¾ inch or larger in diameter.

C. Minimum raceway size shall be ¾".

PART 3 - EXECUTION

3.1 RIGID GALVANIZED STEEL (RGS) CONDUIT

A. RGS shall be used where exposed to weather or where subject to physical damage in exposed areas below 8'0" above finished floor.

B. RGS shall be used in NEC classified hazardous locations with seal connections per NEC requirements.

C. All conduits exposed below 4 feet of finish grade on walls shall be rigid conduit.

D. Roof top conduits (rigid steel) will be neatly grouped and installed parallel to the building lines. Support for conduit shall be rubber sleepers with unistrut on top.

3.2 ELECTRICAL METALLIC TUBING (EMT)

A. EMT shall be run indoors concealed in drywall type construction, above suspended ceilings, and exposed indoors not less than 8'0" above finished floor in unfinished areas.

B. EMT shall not be installed underground, outdoors, or embedded in concrete.

3.3 ELECTRICAL NON-METALLIC TUBING (ENT)

A. ENT shall be run indoors concealed in drywall type construction where permissible by Code and by the local authority. ENT shall not be installed in any exposed areas.

B. ENT to be installed embedded in concrete shall be approved by the Structural Engineer prior to installation. All embedded installations shall comply with the installation requirements provided by the Structural Engineer.

3.4 FLEXIBLE METALLIC CONDUIT

A. Flexible conduit shall be used for indoor lighting connections in suspended ceiling areas and shall not exceed 6'0" in length.

B. Flexible conduit shall be used for final connection to control equipment and not to exceed 2'0" in length.

C. The conduit grounding system shall be continuous as recommended by the manufacturer and UL approved.

D. Conduit run above suspended ceilings will be supported from the building structure independently and will be run with sufficient clearance from the ceiling system to permit the tiles to be removed and to allow full access to the space above.

3.5 LIQUID TIGHT FLEXIBLE CONDUIT

A. Liquid tight flexible conduit shall be used for final connection to machines, motors, transformers and equipment that requires vibration isolation.

B. Liquid tight flexible conduit shall be used for final connection to equipment in wet or damp locations or where exposed to grease, water, dust, dirt, vapors, or chemicals.

C. The conduit grounding system shall be continuous as recommended by the manufacturer and UL requirements.

3.6 POLYVINYL CHLORIDE (PVC) CONDUIT

A. All sweeps, bends, and risers shall be concrete encased Schedule 80.

B. All underground high voltage conduit, telephone conduit, service entrance conduit and feeders 100A and over shall have 3" of red mixed concrete cover and a metallic locating tape installed 6” above the top of the conduit.

C. All PVC conduit feeders shall contain a copper green grounding conductor sized per NEC requirements and continuity shall be maintained throughout conduit runs and pullboxes.

D. All P.V.C. will be buried below ground level and NEVER be in a concrete slab or concrete floor.

E. All stub-ups in P.V.C. will be changed to E.M.T.in walls. Exceptions are outside block wall can be P.V.C. No flexible conduit will be used.

3.7 CONDUIT INSTALLATION

A. All conduit installation methods shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

B. All conduit installations shall comply with the manufacturer's installation requirements.

C. All spare conduit shall be cleaned, mandrelled, and provided with a pullwire.

END OF SECTION 260533

SECTION 26 05 34

BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor's Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Box materials
2. Accessory materials

PART 2 - PRODUCTS

2.1 Boxes shall be flat rolled steel sized as required by code and as suitable for the application. Boxes shall have mounting holes and knock-outs in sides and back. Grounding shall be accommodated by means of threaded holes.

2.2 Provide accessories, extension rings, gaskets, supports, trim rings, hangers, straps, and other material as necessary for a complete code complying installation.

2.3 Boxes installed outdoors shall be weathertight, dusttight, and corrosion resistant. Provide gaskets and conduit hubs.

2.4 Provide type FS boxes for surface mounted applications.

2.5 Provide additional support for boxes as necessary when mounting fixtures or devices from boxes.

2.6 Provide ganged boxes for multiple switches and devices; provide barriers for boxes served by separate voltages.

2.7 Acceptable manufacturers shall be Appleton, Crouse Hinds, Steel City, or Raco.

2.8 Inside wiring device boxes and junction boxes will be at least 4" square by 1 1/8 inch deep.

2.9 Electrical, phone, and data floor boxes will be brass type (RFB style Walker) with tamper – proof screw cap only. All brass covers will be flush with the floor. Floor monuments are not acceptable.

2.10 Flat wiring will not be used.

2.11 Junction and switch boxes shall be a minimum of 4” square in size and a minimum of 2-1/8” deep.

PART 3 - EXECUTION

3.1 All box installation methods shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Install all boxes plumb, square, and securely fastened to structure.

3.3 Boxes shall be placed such that they are readily accessible.

3.4 Cover or plug all unused openings in boxes where knockout blanks have been removed.

3.5 Install boxes such that they are flush with the finished surface of the wall or surface within which they are mounted.

3.6 Install all boxes at mounting heights per architectural plans, NEC requirements, and ADA requirements.

3.7 Boxes shall not be mounted back to back in walls. Minimum offset shall be 12”.

3.8 Boxes in sealed environments shall be sealed with an approved sealant suitable for the application.

3.9 Boxes penetrating fire rated walls or surfaces shall be sealed with a Fire Marshal approved fire sealant to maintain the fire rating of the wall or surface.

3.10 Boxes located above inaccessible ceilings shall be made accessible by means of access doors or hatches in the ceiling.

3.11 Install all boxes per manufacturer’s recommendations and requirements.

3.12 Provide for ground continuity at all boxes.

3.13 All outdoor outlets will be installed in a recessed stainless steel box with a flush, cover with a 20 amp G.F.C.I. receptacle and on a separate circuit. For gazebos and outside public areas.

END OF SECTION 260534

SECTION 26 05 36

CABLE TRAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Cable tray materials
2. Fitting and bonding materials
3. Installation materials and methods

1.4 DELIVERY, STORAGE, AND HANDLING

A. Aluminum cable tray may be stored outside with cover, shall be loosely stacked, shall be elevated off the ground, and ventilated to prevent staining during storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. PW Industries.

2.2 MATERIALS AND FINISHES

A. Cable Trays, Fittings, and Accessories: Aluminum, complying with NEMA VE 1, Aluminum Association's Alloy 6063-T6 for rails, rungs, and cable trays, and Alloy 5052-H32 or Alloy 6061-T6 for fabricated parts; with Type 316 stainless-steel splice-plate fasteners, bolts, and screws

B. Cable Trays, Fittings, and Accessories: Stainless steel, Type 316, complying with NEMA VE 1.

C. Sizes and Configurations: Refer to the Drawings for specific requirements for types, materials, sizes, and configurations.

1. Center-hanger supports may be used only when specifically indicated.

2.3 CABLE TRAY ACCESSORIES

A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.

B. Barrier Strips: Same materials and finishes as cable tray.

C. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

2.4 SOURCE QUALITY CONTROL

A. Perform design and production tests according to NEMA VE 1.

PART 3 - EXECUTION

3.1 CABLE TRAY INSTALLATION

A. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.

B. Remove burrs and sharp edges from cable trays.

C. Fasten cable tray supports to building structure and install seismic restraints.

1. Design each fastener and support to carry load indicated by Seismic Design Category D requirements.
2. Place supports so that spans do not exceed maximum dictated by the NEC.
3. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.
4. Manufacture center-hung support, designed for 60 percent versus 40 percent eccentric loading condition, with a safety factor of 3.
5. Locate and install supports according to NEMA VE 1.

D. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.

E. Install expansion connectors where cable tray crosses building expansion joints or seismic joints. Space connectors and set gaps according to applicable standard.

F. Make changes in direction and elevation using standard fittings.

G. Make cable tray connections using standard fittings.

H. Seal penetrations through fire and smoke barriers according to Division 7 Section "Through-Penetration Firestop Systems."

I. Workspace: Install cable trays with enough space to permit access for installing cables.

3.2 CONNECTIONS

A. Ground cable trays according to manufacturer's written instructions.

B. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70.

3.3 FIELD QUALITY CONTROL

A. After installing cable trays and after electrical circuitry has been energized, survey for compliance with requirements. Perform the following field quality-control survey:

1. Remove deposits of dust, industrial process materials, trash of any description, and any blockage of tray ventilation.
2. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and retorque in suspect areas.
3. Check for missing or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
4. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that all takeoff raceways are bonded to cable tray.

END OF SECTION 260536

SECTION 26 05 44

PRECAST MANHOLES AND HANDHOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Manhole material
2. Handhole material
3. Installation materials and methods

B. Product data: For the following:

1. Shop drawings for precast or factory-fabricated manholes and handholes: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:

    a. Duct entry provisions, including locations and duct sizes.
    b. Reinforcement details.
    c. Frame and cover design and manhole frame support rings.
    d. Ladder details.
    e. Grounding details.
    f. Dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
    g. Joint details.

2. Shop drawings for factory-fabricated manholes and handholes other than precast concrete: Include dimensioned plans, sections, and elevations, and fabrication and installation details, including the following:

    a. Duct entry provisions, including locations and duct sizes.
    b. Cover design.
    c. Grounding details.
    d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

3. Product Certificates: For concrete and steel used in precast concrete manholes and handholes, as required by ASTM C 858.
4. Qualification Data: For professional engineer and testing agency.
5. Source quality-control test reports.
6. Field quality-control test reports.

C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

D. Comply with ANSI C2.

E. Comply with NFPA 70.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store precast concrete and other factory-fabricated underground utility structures at project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

B. Lift and support precast concrete units only at designated lifting or supporting points.

1.5 COORDINATION

A. Coordinate layout and installation of manholes and handholes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances into manholes and handholes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Architect.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE HANDHOLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Christy Concrete Products.
2. Oldcastle Precast Group.
3. Utility Vault Co.

C. Comply with ASTM C 858 for design and manufacturing processes.

D. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole.

1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
2. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
3. Cover Legend: Molded lettering, as indicated for each service.

4. Configuration: Units shall be designed for flush burial and have Integral closed bottom, unless otherwise indicated.
5. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
6. Handholes located in vehicle areas shall feature a minimum full traffic H-20 rating.

2.2 PRECAST CONCRETE MANHOLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Christy Concrete Products.
2. Oldcastle Precast Group.
3. Utility Vault Co.

C. Comply with ASTM C 858**,** with interlocking mating sections, complete with accessories, hardware, and features.

D. Manholes located in vehicle areas shall feature a minimum full traffic H-20 rating.

E. Concrete Knockout Panels: 1-1/2 to 2 inches thick, for future conduit entrance and sleeve for ground rod.

F. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

2.3 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

PART 3 - EXECUTION

3.1 INSTALLATION OF CONCRETE MANHOLES AND HANDHOLES

A. Precast Concrete Handhole and Manhole Installation:

1. Comply with ASTM C 891, unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, and compacted to same density as adjacent undisturbed earth.

B. Elevations:

1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.
3. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.

C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated on civil drawings.

D. Manhole Access: Circular opening in manhole roof; sized to match cover size.

3.2 GROUNDING

A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding."

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.4 CLEANING

A. Clean internal surfaces of manholes and handholes. Remove foreign material.

END OF SECTION 260544

SECTION 26 05 73

OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

1. Coordination of series-rated devices is permitted where indicated on Drawings.

1.3 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.

C. Qualification Data: For coordination-study specialist.

D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals [shall] [may] be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and Equipment Evaluation Reports.
3. Coordination-Study Report.

1.4 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.

B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.

C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.

D. Comply with IEEE 399 for general study procedures.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Available Computer Software Developers: Subject to compliance with requirements, companies offering computer software programs that may be used in the Work include, but are not limited to, the following:

B. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide:

1. SKM Systems Analysis, Inc.

2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

A. Comply with IEEE 399.

B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

a. Arcing faults.
b. Simultaneous faults.
c. Explicit negative sequence.
d. Mutual coupling in zero sequence.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

A. Gather and tabulate the following input data to support coordination study:

1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Impedance of utility service entrance.
3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:

    a. Circuit-breaker and fuse-current ratings and types.
    b. Relays and associated power and current transformer ratings and ratios.
    c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    d. Generator kilovolt amperes, size, voltage, and source impedance.
    e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
    f. Busway ampacity and impedance.
    g. Motor horsepower and code letter designation according to NEMA MG 1.

4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Ratings, types, and settings of utility company's overcurrent protective devices.
    f. Special overcurrent protective device settings or types stipulated by utility company.
    g. Time-current-characteristic curves of devices indicated to be coordinated.

h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

3.3 FAULT-CURRENT STUDY

A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:

1. Switchgear and switchboard bus.
2. Distribution panelboard.
3. Branch circuit panelboard.

B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.

C. Calculate momentary and interrupting duties on the basis of maximum available fault current.

D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.

1. Transformers:

a. ANSI C57.12.10.
b. ANSI C57.12.22.
c. ANSI C57.12.40.
d. IEEE C57.12.00.
e. IEEE C57.96.

2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
3. Low-Voltage Fuses: IEEE C37.46.

E. Study Report:

1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.

F. Equipment Evaluation Report:

1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

3.4 COORDINATION STUDY

A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.

1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.
3. Calculate the maximum and minimum ground-fault currents.

B. Comply with IEEE 241 recommendations for fault currents and time intervals.

C. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.
b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

D. Motors served by voltages more than 600 V shall be protected according to IEEE 620.

E. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

F. The arc flash study shall analyze the Flash Boundary Distance and the range of incident energy based on the calculated available fault current range at each device.

1. Provide Arc Flash Hazard Warning labels printed in color on adhesive backed nylon labels for all electrical equipment identified on the one line drawings. Also include the system operating voltage and date of issue.

G. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:

1. The results of the power system study shall be summarized in a final report, stamped and signed by a professional engineer. Six (6) bound copies in 3-ring binders of the final report along with a disk of the database, libraries and reports shall be submitted to Qualcomm. The report shall include the following sections:

    a. Descriptions, purpose, basis, and scope of study.
    b. General summary evaluation of the findings and recommendations.

        1) Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties, and commentary regarding the equipment to exceed the calculated values by 25%.
        2) Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same to maximize selective coordination and minimize incident energy. Graphically illustrate on log-log paper that adequate time separation exists between series devices. Plot the specific time-current characteristics of each protective device in such a manner that all applicable upstream devices will be clearly depicted on one sheet with no more than six overcurrent protective devices on a single plot.
        3) Surge arrestor coordination study.
        4) Fault current calculations including a definition of terms and guide for interpretation of computer printout.
        5) Show, on the one-line diagram:

            a) All electrical equipment and wring to be protected by the overcurrent devices including both breakers and fuses. Multiple one-line diagrams may be used if required to clearly present all of the require data.
            b) Calculated fault impedance, X/R ratios, and short circuit values at all connected buses on the one line diagram.
            c) Breaker and fuse ratings.
            d) Transformer kVA and voltage ratings, percent impedance, X/R ratios, and wiring connections.
            e) Voltage at each bus.
            f) Identification of each bus.
            g) Conductors per phase, conductor’s size, length, and ampacity.
            h) Arc flash boundary.
            i) Incident energy in ca/cm2.

2. Tabular Format of Settings Selected for Overcurrent Protective Devices:

    a. Device tag.
    b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
    c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
    d. Fuse-current rating and type.

e. Ground-fault relay-pickup and time-delay settings.

3. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

   a. Device tag.
   b. Voltage and current ratio for curves.
   c. Three-phase and single-phase damage points for each transformer.
   d. No damage, melting, and clearing curves for fuses.
   e. Cable damage curves.
   f. Transformer inrush points.
   g. Maximum fault-current cutoff point.

H. Completed data sheets for setting of overcurrent protective devices.

END OF SECTION 260573

SECTION 26 05 75

ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 It is the intent of these acceptance tests to assure that all Contractor supplied equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with designed specifications.

1.2 The acceptance tests and inspections shall determine suitability for energization of switchgear and cables.

1.3 Items that shall be checked, inspected, and tested include, but are not limited to, the following:

A. SF6 switches and overcurrent protection devices

B. Relays

C. Ammeters

D. Voltmeter

E. Wattmeters

F. Varmeters

G. Voltage transducer

H. Current transducers

I. Watt transducers

J. Var transducers

K. AUX compartment with control power transformer

L. AUX compartment with potential transformer

M. AUX compartment with batteries and rectifier

N. Sets of Current Transformers

O. Surge arrestors

P. Grounding system

Q. Power/Lighting panelboards

R. 15kV rated cable

S. 600V rated cable

T. Substations and distribution switchgear

U. Automatic Transfer Switches

1.4 APPLICABLE CODES

A. All inspections and tests shall be in accordance with the following applicable codes and standards except as provided otherwise herein.

1. National Electrical Code - NEC 2005 Edition.
2. National Electrical Manufacturer's Association - NEMA.
3. American Society for Testing and Materials - ASTM.
4. Institute of Electrical and Electronic Engineers - IEEE.
5. National Electrical Testing Association - NETA.
6. American National Standards Institute - ANSI:

    a. C2, National Electrical Safety Code
    b. Z244-1, American National Standard for Personnel Protection

7. State Codes and Ordinances.
8. Insulated Cable Engineers Association - ICEA.
9. Association of Edison Illuminating Companies - AEIC.
10. Occupational Safety and Health Administration:

    a. Part 1910, Subpart S, 1910.308
    b. Part 1926, Subpart V, 1926.950 through 1926.960

11. National Fire Protection Association - NFPA:

    a. ANSI/NFPA 70B, Electrical Equipment Maintenance
    b. NFPA 70E, Electrical Safety Requirements for Employee Workplaces
    c. ANSI/NFPA 70, National Electrical Code 2005 Edition
    d. ANSI/NFPA 78, Lightning Protection Code
    e. ANSI/NFPA 101, Life Safety Code

12. All inspections and tests shall utilize the following references:

    a. Project Design Specification.
    b. Project Design Drawings.
    c. Manufacturer's instruction manuals applicable to each particular apparatus.

1.5 QUALIFICATIONS OF TESTING AGENCY

A. The testing firm shall be an independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm.

B. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.

C. The testing firm shall meet federal OSHA criteria for accreditation of testing laboratories, Title 29, Parts 1907, 1910, and 1936. Full membership in the National Electrical Testing Association constitutes proof of such criteria.

D. The lead, on site, technical person shall be currently certified by the National Electrical Testing Associate (NETA) in Electrical Power Distribution System Testing.

E. Testing firm shall utilize only full-time technicians who are regularly employed by the firm for testing services. Electrically unskilled employees are not permitted to perform testing or assistance of any kind. Electricians may assist, but may not perform testing and/or inspection services.

F. The testing firm shall submit proof of the above qualifications.

G. The testing firm shall be an independent organization as defined by OSHA Title 29, Part 1936 and the National Electrical Testing Association.

H. All instruments used by the testing firm to evaluate electrical performance shall meet NETA's Specifications for Test Instruments. (See Section 1.7 of this specification).

I. The terms used herewith such as Test Agency, Testing Laboratory, or Contractor Test Company, shall be construed to mean testing firm.

1.6 RESPONSIBILITIES

A. The Contractor shall notify the Owner's Representative prior to commencement of any testing.

B. Any system, material or workmanship which is found defective on the basis of acceptance tests shall be reported.

C. The testing firm shall maintain a written record of all tests and upon completion of project, assemble and certify a final test report.

D. A stable source of 60 hertz power shall be provided for testing purposes by the Contractor. All tests shall be witnessed by Owner's Representative and a minimum of 14 days notice shall be provided.

1.7 TEST EQUIPMENT

A. Test Instrument Calibration

1. The testing firm shall have a calibration program which assures that all applicable test instrumentation are maintained within rated accuracy.
2. The accuracy shall be directly traceable to the National Bureau of Standards.
3. Instruments shall be calibrated in accordance with the following frequency schedule:

    a. Field instruments: Analog - 6 months maximum
    Digital - 12 months maximum
    b. Laboratory Instruments - 2months
    c. Leased specialty equipment - 12 months (where accuracy is guaranteed by lessor)

4. Dated calibration labels shall be visible on all test equipment.
5. Records must be kept up-to-date which show date and results of instruments calibrated or tested.
6. An up-to-date instrument calibration instruction and procedure will be maintained for each test instrument.
7. Calibrating standard shall be of higher accuracy than that of the instrument tested.

1.8 TEST REPORTS

A. The test report shall include the following:

1. Summary of project.
2. Description of equipment/device tested.
3. Description of test, including date, time, and duration of test.
4. Test results.
5. Conclusions and recommendations.
6. Appendix, including appropriate test forms.
7. Identification of test equipment used.
8. Signature of responsible test organization authority.
9. Signature of the person witnessing the tests.
10. Furnish five copies of the complete report to the Owner’s Representative no later than thirty (30) days after completion of project unless otherwise directed.

1.9 SAFETY AND PRECAUTIONS

A. Safety practices shall include, but are not limited to, the following requirements:

1. Occupational Safety and Health Act of 1970 - OSHA.
2. Accident Prevention Manual for Industrial Operations, National Safety Council, Chapter 4.
3. Applicable State safety operating procedures.
4. NETA Safety/Accident Prevention Program.
5. Owner’s safety practices.
6. National Fire Protection Association - NFPA 70E.
7. ANSI Z244.1 American National Standards for Personnel Protection.

B. All tests shall be performed with apparatus de-energized except where otherwise specifically required.

C. The testing firm shall have a designated safety representative on the project to supervise operations with respect to safety.

PART 2 - PROTECTIVE DEVICE COORDINATION STUDY

2.1 A protective coordination study shall be performed using SKM's Dapper or equal software to select or check the selection of power fuse ratings, protective relay characteristics and settings, ratios, and characteristics of associated voltage breaker trip characteristics and settings.

2.2 The coordination study shall include all voltage classes of equipment from the Owner's main incoming line and down to and including panelboards. The entire electrical system shall be included in the coordination study including all emergency feeders. Verify characteristics and settings of existing devices in the field and from the manufacturer.

2.3 The time-current characteristics of the specified protective devices shall be plotted on the appropriate log-log paper. The plots shall include complete titles, representative one-line diagrams of both buildings and legends, associated relays or fuse characteristics, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves, and fuse curves. The coordination plots shall indicate the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, cable damage curves, symmetrical and asymmetrical fault currents. All requirements of the current National Electrical Code shall be adhered to. Reasonable coordination intervals and separation of characteristic curves shall be maintained. Separate coordination plots for phase and ground protective devices shall be provided on a system basis. Separate curves shall be used to clearly indicate the coordination achieved for feeder breakers with downstream fuses and circuit breakers in switchgear and substations. There shall be a maximum of six protective devices per plot.

2.4 The selection and setting of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios, manufacturer, type, range of adjustment, and recommended settings. Discrepancies, problem areas, or inadequacies shall be promptly brought to the project Owner's Representative's attention.

2.5 Five copies of coordination curves and tabulated data indicating selection and settings of protective devices shall be submitted to the Owner's Representative for approval.

PART 3 - EQUIPMENT VERIFICATIONS, TESTS, AND CALIBRATIONS

3.1 GENERAL

A. As part of the contract, the Contractor shall perform tests of installed work as herein specified and specified in other Sections of these Specifications.

B. The Contractor shall provide all materials, equipment, labor and technical supervision to perform such tests and inspections.

C. All tests shall be performed in compliance with the recommendations and requirements of the National Electrical Testing Association, Inc. (NETA), and applicable codes and standards.

D. Upon completion of the tests and inspections noted in these Specifications, a label shall be attached to all serviced devices. These labels shall indicate date serviced and the service company responsible.

E. The test and inspections shall determine suitability for continued reliable operation.

F. All tests shall be conducted in the presence of the Owner's Representative. Provide a minimum of two weeks notice to the Owner's Representative.

G. Furnish the necessary equipment and personnel to perform all required tests of all wiring and connections for continuity, short circuit, and improper grounds. Included, but not limited to, the following systems: substations, SF6 switches, air interrupting switches, low voltage main and feeder circuit breakers, interlocking controls, panelboards, distribution transformers, branch circuits.

3.2 SWITCHGEAR, SUBSTATIONS, DISTRIBUTION BOARDS, AND EMERGENCY SYSTEM-GENERAL

A. Visual and mechanical inspection:

1. Inspect for physical damage and code violations.
2. Clean interior and exterior surfaces.
3. Inspect for proper alignment, anchorage, and grounding.
4. Check tightness of accessible bolted bus joints by torque wrench method. Tighten connections in accordance with industry standard torque levels.
5. Make closure attempt on locked open devices. Make opening attempt on locked closed devices.
6. Make exchange with devices operated in off-normal positions.

B. Electrical tests:

1. Measure insulation resistance of each bus section phase-to-phase and phase-to-ground.
2. Inspect all accessible bus joints and cable connections by infrared scanner to detect loose or high-resistance connections and other circuit anomalies.
3. Inspect correctness of control wiring.

3.3 MEDIUM VOLTAGE SF6 SWITCHES AND OVERCURRENT PROTECTION

A. Visual and mechanical inspection:

1. Inspect for physical condition.
2. Inspect alignment and grounding.
3. Perform mechanical operator and contact alignment tests on the breaker and its operating mechanism in accordance with manufacturer's instructions.
4. Perform insulation resistance test on control wiring.
5. Clean mechanism, insulating surfaces and contacts.
6. Check pressure of all SF6 containers if applicable.

B. Electrical Tests

1. Measure contact resistance.
2. Trip overcurrent protective device by operation of each protective device.
3. Perform an insulation resistance test phase-to-ground, phase-to-phase and across open contacts.
4. Perform insulation resistance test in accordance with Doble procedure.
5. Perform timing test with Travel Analyzer to insure proper contact overtravel and pressure.
6. Test all SF6 pressure alarm and trip relays.

3.4 SURGE ARRESTERS

A. Visual and mechanical inspection:

1. Inspect for physical damage such as chipped or fractured porcelain.
2. Inspect ground and discharge counter connections for integrity.

B. Electrical tests:

1. Perform a 60Hz sparkover test.
2. Perform a radio influence voltage (RIV) test.
3. Perform an insulation power factor test.
4. Perform ground continuity test to ground grid system.

3.5 BATTERY SYSTEM

A. Visual and mechanical inspection:

1. Inspect for physical damage, anchorage, electrolyte leakage and level.
2. Check intercell bus link and cable connection integrity for tightness and corrosion.

B. Electrical tests:

1. Measure system charging voltage and each individual cell voltage.
2. Measure electrolyte specific gravity.
3. Perform infrared scan of the intracell links cable connections under current discharge conditions.

3.6 INSTRUMENT TRANSFORMER

A. Visual and mechanical inspection:

1. Inspect for physical damage and connection tightness.
2. Check transformer nameplate with singleline diagram.
3. Check proper operation of grounding or shorting devices.

B. Electrical tests:

1. Measure current transformer ratio by primary current injection.
2. Measure potential transformer ratio.
3. Measure insulation resistance primary-to-ground, secondary-to-ground and primary-to-secondary.
4. Verify secondary wiring connections by secondary current injection.
5. Verify transformer polarity markings.
6. Perform current transformer saturation test. Plot transformer voltage current curve.

3.7 METERING AND INSTRUMENTATION

A. Visual and mechanical inspection:

1. Check all devices for physical damage and connection tightness.
2. Verify meter nameplate designation.

B. Electrical tests:

1. Check calibration of all panel meters at zero, midscale and full scale deflections by transfer standard.
2. Test Digital Instrumentation Package per manufacturer’s requirements.
3. Verify all instrument multipliers and scale factors.
4. Check polarities and correct rotations.

3.8 CONTROL POWER TRANSFORMERS - ENCAPSULATED TYPE

A. Visual and mechanical inspection:

1. Inspect for physical damage, proper installation, anchorage, and grounding.
2. Clean interior and all bushing and insulator surfaces.
3. Verify proper auxiliary device operation such as fans and indicators.
4. Check tightness of accessible bolted electrical joints. Tighten connections in accordance with industry standards.

B. Electrical tests:

1. Perform insulation resistance tests winding-to-winding and winding-to-ground. Apply appropriate guard circuit over all bushings.

2. Perform dielectric absorption test winding-to-winding and winding-to ground for ten (10) minutes. Compute the polarization index.
3. Perform turns ratio test between windings for all top positions.
4. Perform insulation power factor tests on all high and low-voltage windings.
5. Check output voltages.

3.9 PROTECTIVE RELAYS

A. Visual and mechanical inspection:

1. Inspect relays for physical damage, presence of foreign material, moisture, condition of spiral spring, disc clearance and corrosion.
2. Clean cover glass interior and relay components.
3. Check for freedom of movement, proper travel and alignment, and tightness of mounting hardware and top screws.

B. Electrical test:

1. Perform insulation resistance tests on each circuit branch to frame.
2. Perform the following tests at the settings specified by Owner's Representative:

    a. Pickup parameters on each operating element.
    b. Timing at three (3) points on time dial curve.
    c. Pickup target and seal in units.
    d. Special test as required to check operation of restraint, and other elements per manufacturer's instructions.

3. Perform phase angle and magnitude contribution tests on all differential type relays after energization to vectorially prove proper polarity and connection.
4. Check polarity and correctness of control wiring.

C. Relay calibration and tests:

1. Two relay wiring tests shall be made.

    a. Primary circuit polarity test shall include a DC test from the current transformer to each terminal block and relay terminal.
    b. Relay and circuit breaker operation test by application of power from the portable relay test set.

D. Relay testing shall be accomplished after completion of the switchgear installation, using standard portable test set equipment and the relay manufacturer's testing directions and parameters to determine conformance of the relay to the time-overcurrent information given in the manufacturer's performance curves and the tap settings provided by coordination study.

Overcurrent relay testing shall include:

1. Zero set tests.
2. Pickup tests.
3. Time-current characteristic (operation at currents 3 and 4 times the directed tap settings), and instantaneous at the directed tap setting.
4. Target and seal-in operation.

E. Target differential relays shall be tested similarly, except for the following additional tests:

1. Low voltage "through-currents" of approximately "full load" and "fault" magnitudes shall be circulated in HV busses. Bus differential relays shall not trip.
2. Low voltage currents shall be circulated within the differential zones of "low-fault" and "high-fault" magnitudes. Bus differential relays shall initiate tripping momentarily.

3.10 CABLES 15kV

A. Visual and mechanical inspections:

1. Inspect exposed section for tracking corona, and physical damage.
2. Clean all creepage from surfaces of termination.

B. Inspect shield grounding, cable support, and termination.

1. Perform infrared scan of all connections under loaded conditions.

C. Electrical tests:

1. Perform shield and conductor continuity test by ohmmeter method. Record ohmic value.
2. Perform insulation-resistance test of each cable with respect to ground and adjacent cables.
3. Perform DC hypotential test:

a. Test each conductor individually with all other conductors grounded. All shields to be grounded.
b. Corona at terminations will be suppressed with guard rings, field reduction spheres, or other suitable methods.
c. Apply DC hypotential in at least eight (8) equal increments until maximum test voltage is reached. Record DC leakage current at each step after a constant stabilization time, consistent with system charging current decay. Plot leakage current (X axis) versus voltage (Y axis) at each increment.

d. Raise the test conductor to a maximum test voltage and hold for a total of ten (10) minutes. Record readings of leakage current (Y axis) versus time (X axis) and plot on thirty (30) second intervals for the first two (2) minutes and every minute thereafter. Perform maximum voltage decrement test by reducing the applied

voltage to zero and monitoring voltage decay versus time. Apply grounds upon completion to drain all absorpic potential to zero.

e. Test each conductor in accordance with Section E of AEIC C56.

3.11 LOW VOLTAGE CIRCUIT BREAKERS

A. Visual and mechanical inspection:

1. Inspect for physical condition.
2. Inspect alignment and grounding.
3. Perform mechanical operator and contact alignment tests on the breaker and its operating mechanism in accordance with manufacturer's instructions.
4. Perform insulation resistance test on control wiring.
5. Clean mechanism, insulating surfaces and contacts.

B. Electrical tests:

1. Measure contact resistance.
2. Trip overcurrent protective device by operation of each protective device.
3. Perform an insulation resistance test phase-to-ground, phase-to-phase and across open contacts.
4. Perform insulation resistance test in accordance with Doble procedure.
5. Perform timing test with Travel Analyzer to insure proper contact overtravel and pressure.

3.12 CABLES, LOW VOLTAGE (600 VOLTS AND LESS)

A. Visual and mechanical inspections:

1. Inspect cables for physical damage and proper connection.
2. Torque test cable connection. Tighten connections in accordance with industry standards.
3. Perform infrared scan of all connections under loaded conditions.

B. Electrical tests:

1. Perform insulation resistance test of each cable with respect to ground and adjacent cables.

3.13 GROUNDING SYSTEMS

A. Visual and mechanical inspection:

1. Inspect ground system connections for completeness and adequacy.

B. Electrical tests:

1. Perform ”fall of the potential” test per IEEE No. 81, Section 9.03 to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral and/or derived neutral points.

3.14 INFRARED INSPECTION

A. All doors and cover shall be removed and upon completion of test be reinstalled by testing agency technicians.

B. A load bank shall be furnished to circulate low voltage currents of 400A magnitude through each bus, main breaker and feeder breaker. After two hours infrared scans shall be made of all bus joints. Problem area shall be photographed before and after corrections. After corrections, another current test of two hours duration shall be made. Again an infrared scan shall be made to confirm correct operation.

C. Upon completion, the switchgear shall be energized at 12kV. After 4 hours, infrared scans shall be made to determine areas of excessive corona. Problem area shall be treated the same as under B., above.

D. Upon completion of infrared scans, all covers and doors shall be reinstalled.

END OF SECTION 260575

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The requirements of this Section apply to all sections of Division 26.

B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned is specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 13 GENERAL COMMISSIONING REQUIRMENTS. A Commissioning Agent/Provider/Specialist appointed by the Owner's Representative will manage the commissioning process.

1.2 RELATED WORK

A. Division 01 GENERAL REQUIREMENTS.

B. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

1.3 SUMMARY

A. This Section includes requirements for commissioning the Facility electrical systems, related subsystems and related equipment. This Section supplements the general requirements specified in Section 01 91 13 General Commissioning Requirements.

B. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for more details regarding processes and procedures as well as roles and responsibilities for all Commissioning Team members.

1.4 DEFINITIONS

A. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for definitions.

1.5 COMMISSIONED SYSTEMS

A. Commissioning of a system or systems specified in Division 26 is part of the construction process. Documentation and testing of these systems, as well as training of the Owner's Operation and Maintenance personnel in accordance with the requirements of Section 01 91 13 and of Division 26, is required in cooperation with the Owner and the Commissioning Agent.

B. The Facility electrical systems commissioning will include the systems listed in Section 01 91 13 General Commissioning Requirements:

1.6 SUBMITTALS

A. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION INSPECTIONS

A. Commissioning of Electrical systems will require inspection of individual elements of the electrical systems construction throughout the construction period. The Contractor shall coordinate with the Commissioning Agent in accordance with Section 01 91 13 and the Commissioning plan to schedule electrical systems inspections as required to support the Commissioning Process.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the Owner and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the type of equipment will be returned to the Contractor for correction and resubmission. Refer to SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

3.3 CONTRACTORS TESTS

A. Contractor tests as required by other sections of Division 26 shall be scheduled and documented in accordance with Division 01 GENERAL REQUIREMENTS. All testing shall be incorporated into the project schedule. Contractor shall provide no less than 7 calendar days' notice of testing. The Commissioning Agent will witness selected Contractor tests at the sole discretion of the Commissioning Agent. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

3.4 SYSTEMS FUNCTIONAL PERFORMANCE TESTING

A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the Resident Engineer. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor and witnesses of the tests shall sign and date a testing attendance form to verify tests were performed. See Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

3.5 TRAINING OF OWNER'S PERSONNEL

A. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. Contractor shall submit training agendas, trainer resumes, and a training attendance form in accordance with the requirements of Section 01 91 13. These documents will be reviewed by the Commissioning Agent and included in the Final Commissioning Report. The instruction shall be scheduled in coordination with the Resident Engineer after submission and approval of formal training plans. Refer to Section 01 79 00 DEMONSTRATION AND TRAINING REQUIREMENTS, 01 91 13 GENERAL COMMISSIONING REQUIREMENTS and Division 26 Sections for additional Contractor training requirements.

SECTION 26 09 23

OCCUPANCY SENSORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 SCOPE

A. Contractor’s work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.

1.3 EQUIPMENT QUALIFICATION

A. Products supplied shall be from a single manufacturer. Mixing of manufacturers shall not be allowed.

B. All components shall be U.L. listed, offer a five (5) year warranty and meet all state and local applicable code requirements.

C. Products shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.

D. Wall switch products must be capable of withstanding the effects of inrush current. Submittals shall clearly indicate the method used.

1.4 SYSTEM DESCRIPTION

A. The objective of this section is to require the proper installation of the occupancy sensor based lighting control system such that lighting is turned off automatically after a reasonable time delay when a room or area is vacated.

B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.

C. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The suppliers obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

1.5 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. Local Code Enforcement Agency Requirements
6. National Electrical Code (NEC)
7. National Electrical Contractor's Association (NECA)
8. National Electrical Manufacturer's Association (NEMA)
9. National Electrical Testing Association (NETA)
10. National Fire Protection Association (NFPA)
11. Underwriter's Laboratories, Inc. (UL)
12. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner's Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.6 SUBMITTALS

A. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.

B. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor.

C. Submit any interconnection diagrams per major subsystem showing proper wiring.

D. Submit standard catalog literature, which includes performance specifications indicating compliance to the specification.

E. Catalog sheets must clearly state any load restrictions when used with electronic ballasts.

1.7 SYSTEM OPERATION

A. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system, or;

B. Factory Startup: It shall be the contractor's responsibility to engage a factory-authorized representative to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system. This service is provided at an additional cost.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Occupancy sensor manufacturer shall be The Watt Stopper.

2.2 PRODUCTS

A. All products shall be Watt Stopper product numbers:

1. Ceiling sensors: DT-300 or DT-355
2. Wall sensors: DT-200
3. Wall sensor switch: DW-100
4. Inteliswitch: TS-400
5. Power Pack (Control Unit): BZ-50 or BZ-150

B. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300SF, and gross motion up to 1000SF.

C. Wall switch sensors shall accommodate loads from 1 to 800 watts at 120V; 1 to 1200W at 277V and shall have 180 degree coverage capability.

D. Wall switch products shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.

E. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.

F. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

G. Were specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.

H. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.

I. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

J. Passive infrared sensors shall have a multiple segmented Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.

K. Where specified, passive infrared and dual technology sensors shall offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.

L. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.

M. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

N. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.

O. Ultrasonic operating frequency shall be crystal controlled at 25kHz within +/- 0.005% tolerance, 32kHz within +/- 0.002% tolerance, or 40kHz +/- 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

P. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.

Q. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

R. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.

S. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.

T. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

U. Were specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

V. All sensors shall have UL rated, 94V-0 plastic enclosures.

2.3 CIRCUIT CONTROL HARDWARE –CU

A. Control Units - For ease of mounting, installation and future service, control unit(s) shall be able to externally mount through a 1/2" knock-out on a standard electrical enclosure and be an integrated, self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power. Control unit shall provide power to a minimum of two (2) sensors.

B. Relay Contracts shall have ratings of:

1. 13A - 120 VAC Tungsten
2. 20A - 120 VAC Ballast
3. 20A - 277 VAC Ballast

C. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded U.L. Classified, PVC insulated or teflon jacketed cable suitable for use in plenums, were applicable.

D. Minimum acceptable wire gauge from the circuit control hardware relays shall be #14 AWG.

PART 3 - EXECUTION

3.1 INSTALLATION

A. It shall be the contractor’s responsibility to locate and aim sensor in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer’s recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.

B. It is the contractor's responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the owner's facility, to verify placement of sensors and installation criteria.

C. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

END OF SECTION 260923

SECTION 26 09 36

MODULAR DIMMING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 SCOPE

A. This Section includes the following:

1. Manual modular dimming controls.
2. Integrated, multi-preset modular dimming controls.

1.3 QUALITY ASSURANCE AND STANDARDS

A. The latest revision of the standards listed below form an integral part of this specification:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. Local Code Enforcement Agency Requirements
6. National Electrical Code (NEC)
7. National Electrical Contractors Association (NECA)
8. National Electrical Manufacturer's Association (NEMA)
9. National Electrical Testing Association (NETA)
10. National Fire Protection Association (NFPA)
11. Underwriters' Laboratories, Inc. (UL)
12. International Building Code (IBC)
13. Illuminating Engineering Society of North America (IESNA)
14. Certified Ballast Manufacturers (CBM)

1.4 DEFINITIONS

A. Fade Rate: The time it takes each zone to arrive at the next scene, dependent on the degree of change in lighting level.

B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling and power-limited circuits.

C. Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity.

D. SCR: Silicon-controlled rectifier.

E. Zone: A fixture or group of fixtures controlled simultaneously as a single entity. Also known as a "channel."

1.5 SUBMITTALS

A. Shop drawings for all dimming equipment and components shall be submitted and reviewed prior to fabrication. Any material produced prior to the review of shop drawings or samples, and not in conformance with the Contract Documents, may be rejected with the Contractor bearing full responsibility and cost. Submit shop drawings per Section 26 05 00 for review, include the following:

1. Product Data: For each type of product indicated.

    a. For modular dimming controls; include elevation, dimensions, features, characteristics, ratings, and labels.
    b. Device plates and plate color and material.
    c. Ballasts and lamp combinations compatible with dimmers.
    d. Wiring Diagrams: Power, signal, and control wiring.

2. Samples for Initial Selection: For master and remote-control stations, and faceplates with factory-applied color finishes and technical features. Provide samples only if requested.
3. Samples for Verification: For master and remote-control stations, and faceplates with factory-applied color finishes and technical features. Provide samples only if requested.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

C. Materials and equipment as well as workmanship provided under this section shall be new and shall conform to the highest commercial standards, and as specified and as indicated on the drawings. Dimming system parts and components not specifically identified or indicated shall be made of materials most appropriate to their use or function and as such resistant to corrosion, thermal and mechanical stresses encountered in the normal application and function of the device.

1.7 COORDINATION

A. Coordinate features and capabilities of devices specified in this Section with systems and components specified in other Sections to form an integrated system of compatible components. Match components and interconnections for optimum performance of specified functions.

PART 2 - PRODUCTS

2.1 GENERAL DIMMING DEVICE REQUIREMENTS

A. Compatibility: Dimming control components shall be compatible with other elements of lighting fixtures, ballasts, transformers, and lighting controls.

B. Dimmers and Dimmer Modules: Comply with UL 508.

1. Audible Noise and Radio-Frequency Interference Suppression: Solid-state dimmers shall operate smoothly over their operating ranges without audible lamp or dimmer noise or radio-frequency interference. Modules shall include integral or external filters to suppress audible noise and radio-frequency interference.
2. Dimmer or Dimmer-Module Rating: Not less than 125 percent of connected load unless otherwise indicated.

2.2 MANUAL MODULAR MULTISCENE DIMMING CONTROLS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Lutron Electronics, Inc.

B. Description: Factory-fabricated equipment providing manual modular dimming control consisting of a wall-box-mounted, master-scene controller and indicated number of wall-box zone stations. Controls and dimmers shall be integrated for mounting in one-, two-, three-, or four-gang wall box under a single wall plate. Each zone station shall be adjustable to indicated number of scenes, which shall be recorded on the zone controller.

C. Operation: Automatically change variable dimmer settings of indicated number of zones simultaneously from one preset scene to another when a push button is operated.

D. Each manual modular multiscene dimming controller shall include a master control and remote controls.

E. Each zone shall be configurable to control the following:

1. Fluorescent lamps with electronic ballasts.
2. Incandescent lamps.
3. Low-voltage incandescent lamps.
4. LED light engines.
5. Blackout shade motors or switchable devices up to 500W.

F. Memory: Retain preset scenes through power failures for at least seven (7) days.

G. Device Plates: Style, material, and color shall comply with Division 26 Section "Wiring Devices and Connectors".

H. Master-Scene Controller: Suitable for mounting in a single flush wall box.

1. Switches: Master off, group dim, group bright, and selectors for each scene.
2. LED indicator lights, one associated with each scene switch, and one for the master off switch.

I. Fluorescent Zone Dimmer: Suitable for operating lighting fixtures and ballasts specified in Division 26 Section "Interior Lighting," and arranged to dim number of scenes indicated for the master-scene controller. Scene selection is at the master-scene controller for setting light levels of each zone associated with scene.

1. Switch: Slider style for setting the light level for each scene.
2. LED indicator lights, one associated with each scene.
3. Electrical Rating: 1000VA, 120 V.
4. Dimming Range: 0 to 100 percent, full output voltage not less than 98 percent of line voltage.

J. Incandescent Zone Dimmer: Suitable for operating incandescent lamps at line-voltage or low-voltage lamps connected to a transformer and arranged to dim number of scenes indicated for the master-scene controller. Scene selection shall be at the master-scene controller for setting light levels of each zone associated with scene.

1. Switch: Slider style for setting the light level for each scene.
2. LED indicator lights, one associated with each scene.
3. Voltage Regulation: Dimmer shall maintain a constant light level, with no visible flicker, when the source voltage varies plus or minus 2 percent in RMS voltage.
4. Dimming Range: 0 to 100 percent, full output voltage not less than 98 percent of line voltage.

2.3 INTEGRATED, MULTIPRESET MODULAR DIMMING CONTROLS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Lutron Electronics, Inc.

B. Indicate number of wall-box, remote-control stations.

C. Description: Factory-fabricated, microprocessor-based, solid-state controls providing manual dimming control consisting of a master station and multiple wall-box, remote-control stations.

D. Operation: Automatically changes variable dimmer settings of indicated number of zones simultaneously from one preset scene to another when a push button is operated.

E. Each zone shall be configurable to control the following:

1. Fluorescent lamps with electronic ballasts.
2. Incandescent lamps.
3. Low-voltage incandescent lamps.
4. LED light engines.
5. Blackout shade motors or switchable devices up to 500W.

F. Memory: Retain preset scenes and fade settings through power failures by retaining physical settings of controls.

G. Master Station:

1. Contains control panel and multiple control and dimmer modules.
2. Controls and commands adjustment of each dimmer-zone setting for each scene change from one preset scene to another.

    a. Master zone raises and lowers lighting level.
    b. Adjustable fade rate for each scene from 1 to 60 seconds.

3. Rear-illuminated, scene-select buttons.
4. Lighting-level setting and fade-rate setting shall be graphically shown using LEDs or backlighted bar-graph indicator.
5. Mounting: Flush wall box, 3 ½” deep, with manufacturer's standard faceplate.

H. Remote-Control Stations:

1. Numbered push buttons to select scenes.
2. Off switch to turn master station off.
3. On switch turns all scenes of master station to full bright.
4. Control Wiring: NFPA 70, Class 2.
5. Mounting: Single flush wall box, 3 ½” deep, with manufacturer's standard faceplate.

I. Infrared Remote-Control Station: Same functions as for standard remote-control station, except that functions are input by a hand-held infrared transmitter.

J. Dimmers: Modular, plug-in type for each branch circuit.

1. Dimming Circuit: Two SCR dimmers, in inverse parallel configuration.
2. Dimming Curve: Modified "square law" as specified in IESNA's "IESNA Lighting Handbook"; control voltage is 0- to 10-V dc.
3. Dimming Range: 0 to 100 percent, full output voltage not less than 98 percent of line voltage.
4. Voltage Regulation: Dimmer shall maintain a constant light level, with no visible flicker, when the source voltage varies plus or minus 2 percent in RMS voltage.
5. Short-Circuit Rating: 10 kA for 120 V, 14 kA for 277 V.

2.4 CONDUCTORS AND CABLES

A. Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Wire and Cable."

B. Class 2 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Wire and Cable".

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

A. Comply with NECA 1.

B. Wiring Method: Comply with requirements in Division 26 Section "Wire and Cable." Minimum conduit size shall be 1/2 inch.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

D. Size conductors and boxes according to lighting control device manufacturer's written instructions unless otherwise indicated.

E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.2 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Electrical Identification" for identifying components and power and control wiring.

B. Label each dimmer module with a unique designation. Coordinate all labeling with the Architect or Owner.

C. Label each scene control button with approved scene description. Coordinate all labeling with the Architect or Owner.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Continuity tests of circuits.
2. Operational Test: Set and operate controls to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions.

    a. Include testing of modular dimming control equipment under conditions that simulate actual operational conditions. Record control settings, operations, cues, and functional observations.

3. Remove and replace malfunctioning modular dimming control components and retest as specified above.
4. Test Labeling: After satisfactory completion of tests and inspections, apply a label to tested components indicating test results, date, and responsible agency and representative.
5. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train the Owner's maintenance personnel to adjust, operate, and maintain modular dimming controls for a minimum of four (4) hours. Laptop portable computer shall be used in training.

B. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Division 26 Section "Lighting Controls."

END OF SECTION 260936

SECTION 26 09 43

DISTRIBUTED DIGITAL LIGHTING CONTROL SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Digital Lighting Controls
2. Relay Panels
3. Emergency Lighting Control (if applicable)

B. Related Sections

1. Section 265100 – Interior Lighting Fixtures, Lamps, and LED drivers.
2. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.
3. Electrical Sections, including wiring devices, apply to the work of this Section.

C. Control Intent

1. Section includes, but is not limited to:

a. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
b. Initial sensor and switching zones
c. Initial time switch settings
d. Task lighting and receptacle controls
e. Emergency Lighting control (if applicable)

1.2 REFERENCES

A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)

B. Underwriter Laboratories of Canada (ULC)

C. International Electrotechnical Commission (IEC)

D. International Organization for Standardization (ISO)

E. National Electrical Manufacturers Association (NEMA)

F. WD1 (R2005) - General Color Requirements for Wiring Devices

G. Underwriters Laboratories, Inc. (UL)

1. 20 – Plug Load Controls
2. 508– Industrial Controls
3. 916 – Energy Management Equipment
4. 924 – Emergency Lighting

1.3 SYSTEM DESCRIPTION & OPERATION

A. The Lighting Control and Automation system as defined under this section covers the following equipment:

1. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
2. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active infrared (IR) communications.
3. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.
4. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0-10 volt or line voltage forward phase control dimming outputs and integral current monitoring capabilities.
5. Digital Plug-Load Controllers – Self-configuring, digitally addressable, single relay, plenum-rated application-specific controllers. Selected models include integral current monitoring capabilities.
6. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings.
7. Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.
8. Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control.
9. Network Bridge – provides BACnet MS/TP-compliant digital networked communication between rooms, panels and the Segment Manager or building automation system (BAS) and automatically creates BACnet objects representative of connected devices.
10. Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting.
11. Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.
12. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building.

1.4 LIGHTING CONTROL APPLICATIONS

A. Unless relevant provisions of the applicable local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:

1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces except toilet rooms, storerooms, library stacks, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room, open plan system and training room. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and Manual-ON switches.
2. Bi-Level Lighting – Provide multi-level controls in all spaces except toilet rooms, storerooms, library stacks, or applications where variable dimming is used.
3. Task Lighting / Plug Loads – Provide automatic shut off of non essential plug loads and task lighting in all spaces except toilet rooms and storerooms. Provide Automatic-ON of plug loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with the overhead lighting may be used for the area.
4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant local building energy code:

    a. All luminaires within code-defined daylight zones shall be controlled separately from luminaires outside of daylit zones.
    b. Daytime setpoints for total ambient illumination (combined daylight and electric light) levels that initiate dimming shall be programmed in compliance with relevant local building energy codes.
    c. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.
    d. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to turn off electric lighting when daylight is at or above required lighting levels, only if system functions to turn lamps back on at dimmed level, rather than turning full-on prior to dimming.

5. Conference, meeting, training, auditoriums, and multipurpose rooms shall have controls that allow for independent control of each local control zone. Rooms larger than 300 square feet shall instead have at least four (4) pre-set lighting scenes unless otherwise specified. Occupancy / vacancy sensors shall be provided to extinguish all lighting in the space. Spaces with up to four moveable walls shall include controls that can be reconfigured when the room is partitioned.

1.5 SUBMITTALS

A. Submittals Package

1. Submit the shop drawings and the product data specified below at the same time as a package.

B. Shop Drawings

1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
2. Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans).
3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.

C. Product Data

1. Catalog sheets
2. Specifications
3. Installation instructions

D. Data

1. Include data for each device which:

a. Indicates where sensor is proposed to be installed.
b. Prove that the sensor is suitable for the proposed application.

1.6 PROJECT CONDITIONS

A. Do not install equipment until the following conditions can be maintained in spaces to receive equipment:

1. Ambient temperature: 0° to 40° C (32° to 104° F)
2. Relative humidity: Maximum 90 percent, non-condensing

1.7 WARRANTY

A. Provide a five year limited manufacturer’s warranty on all room control devices and panels.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer

1. WattStopper

a. System: Digital Lighting Management (DLM)

B. Basis of Design Product

1. WattStopper Digital Lighting Management (DLM) or subject to compliance and prior approval with specified requirements of this section, one of the following:

a. Copper Leviton

C. Substitutions

1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
2. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design highlighted for review and approval prior to rough-in.

2.2 DIGITAL LIGHTING CONTROLS

A. Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.3 DIGITAL WALL SWITCH OCCUPANCY SENSORS

A. Wallbox mounted passive infrared PIR or dual technology (passive infrared and ultrasonic) digital occupancy sensor with 1 or 2 switch buttons.

B. Digital Occupancy Sensors shall provide scrolling LCD display for digital calibration and electronic documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:

a. Sensitivity – 0-100% in 10% increments
b. Time delay – 1-30 minutes in 1 minute increments
c. Test mode – Five second time delay
d. Detection technology – PIR, Dual Technology activation and/or re-activation

e. Walk-through mode
f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:

a. Each sensor may be programmed to control specific loads within a local network.
b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically during the configurable period of time (default 10 seconds) after turning off.
d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:

1) Ultrasonic and Passive Infrared
2) Ultrasonic or Passive Infrared
3) Ultrasonic only
4) Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
4. Two RJ-45 ports for connection to DLM local network.
5. Two-way infrared (IR) transceiver to allow remote programming through handheld configuration tool and control by remote personal controls.
6. Device Status LEDs including:

a. PIR detection
b. Ultrasonic detection
c. Configuration mode
d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
8. Assignment of local buttons to specific loads within the room without wiring or special tools.
9. Manual override of controlled loads.
10. All digital parameter data programmed into an individual wall switch sensor shall be retained in non-volatile FLASH memory within the wall switch sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet object information shall be available for the following objects:

1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic
4. Button state
5. Switch lock control
6. Switch lock status

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

F. Two-button wall switch occupancy sensors, when connected to a single relay dimming room controller, shall operate in the following sequence as a factory default:

1. Left button

a. Press and release - Turn load on
b. Press and hold - Raise dimming load

2. Right button

a. Press and release - Turn load off
b. Press and hold - Lower dimming load

G. Low voltage momentary pushbuttons shall include the following features:

1. Load/Scene Status LED on each switch button with the following characteristics:

a. Bi-level LED
b. Dim locator level indicates power to switch
c. Bright status level indicates that load or scene is active

2. The following button attributes may be changed or selected using a wireless configuration tool:

a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
b. Individual button function may be configured to Toggle, “On” only or “Off” only.
c. Individual scenes may be locked to prevent unauthorized change.
d. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
e. Ramp rate may be adjusted for each dimmer switch.
f. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

H. WattStopper part numbers: LMPW, LMDW. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.4 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

A. Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor.

B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:

   a. Sensitivity – 0-100% in 10% increments
   b. Time delay – 1-30 minutes in 1 minute increments
   c. Test mode – Five second time delay
   d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation
   e. Walk-through mode
   f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:

   a. Each sensor may be programmed to control specific loads within a local network.
   b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
   c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically within a configurable period of time (default 10 seconds) after turning off.
   d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:

      1) Ultrasonic and Passive Infrared
      2) Ultrasonic or Passive Infrared
      3) Ultrasonic only
      4) Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
4. One or two RJ-45 port(s) for connection to DLM local network.
5. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
6. Device Status LEDs, which may be disabled for selected applications, including:

   a. PIR detection
   b. Ultrasonic detection
   c. Configuration mode
   d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
8. Manual override of controlled loads.
9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet object information shall be available for the following objects:

1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

F. WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC.

2.5 DIGITAL WALL SWITCHES

A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration. Wall switches shall include the following features:

1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
3. Configuration LED on each switch that blinks to indicate data transmission.
4. Load/Scene Status LED on each switch button with the following characteristics:

   a. Bi-level LED
   b. Dim locator level indicates power to switch
   c. Bright status level indicates that load or scene is active

5. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.
6. Programmable control functionality including:

   a. Button priority may be configured to any BACnet priority level, from 1-16, corresponding to networked operation allowing local actions to utilize life safety priority.
   b. Scene patterns may be saved to any button other than dimming rockers. Once set, buttons may be digitally locked to prevent overwriting of the preset levels.

7. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.

B. BACnet object information shall be available for the following objects:

1. Button state
2. Switch lock control
3. Switch lock status

C. Two RJ-45 ports for connection to DLM local network.

D. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.

E. The following switch attributes may be changed or selected using a wireless configuration tool:

1. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
2. Individual button function may be configured to Toggle, “On” only or “Off” only.
3. Individual scenes may be locked to prevent unauthorized change.
4. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
5. Ramp rate may be adjusted for each dimmer switch.
6. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

F. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.6 DIGITAL DAYLIGHTING SENSORS

A. Digital daylighting sensors shall work with room controllers to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to a room controller. Daylighting sensors shall be interchangeable without the need for rewiring.

1. Closed loop sensors measure the ambient light in the space and control a single lighting zone.
2. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.
3. Dual loop sensors measure both ambient and incoming daylight in the space to insure that proper light levels are maintained as changes to reflective materials are made in a single zone.

B. Digital daylighting sensors shall include the following features:

1. The sensor’s internal photodiode shall only measure lightwaves within the visible spectrum. The photodiode’s spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
2. Sensor light level range shall be from 1-6,553 footcandles (fc).
3. The capability of ON/OFF, bi-level or tri-level switching, or dimming, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).

4. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.
5. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.
6. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.
7. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.
8. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
9. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
10. Configuration LED status light on device that blinks to indicate data transmission.
11. Status LED indicates test mode, override mode and load binding.
12. Recessed switch on device to turn controlled load(s) "ON" and "OFF."
13. BACnet object information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:

    a. Light level
    b. Day and night setpoints
    c. Off time delay
    d. On and off setpoints
    e. Up to three zone setpoints
    f. Operating mode – on/off, bi-level, tri-level or dimming

14. One RJ-45 port for connection to DLM local network.
15. A choice of accessories to accommodate multiple mounting methods and building materials. The photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photosensors accommodate mounting materials from 0-0.62" thickness (LMLS-400, LMLS-500). Extended tube photosensors accommodate mounting materials from 0.62"-1.25" thickness (LMLS-400-L, LMLS-500-L). Mounting brackets are compatible with J boxes (LMLS-MB1) and wall mounting (LMLS-MB2). LMLS-600 photosensor to be mounted on included bracket below skylight well.
16. Any load or group of loads in the room can be assigned to a daylighting zone
17. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).
18. All digital parameter data programmed into a photosensor shall be retained in non-volatile FLASH memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.

C. Closed loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from bright sources outside of this cone.

2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.
3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of loads.
4. WattStopper Product Number: LMLS-400, LMLS-400-L.

D. Open loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 60-degree angle cutting off the unwanted light from the interior of the room.
2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling; for dimming operation, a proportional control algorithm shall maintain the design lighting level in each zone.
3. Each of the three discrete daylight zones can include any non overlapping group of loads in the room.
4. WattStopper Product Number: LMLS-500, LMLS-500-L.

E. Dual loop digital photosensors shall include the following additional features:

1. Close loop portion of dual loop device must have an internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from outside sources.
2. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60 degree angle, cutting off the unwanted light from the interior of the room.
3. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.
4. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.
5. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.
6. Device must include extendable mounting arm to properly position sensor within a skylight well.
7. WattStopper product number LMLS-600.

2.7 DIGITAL LOAD CONTROLLERS (ROOM, PLUG LOAD AND FIXTURE CONTROLLERS)

A. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, and will not have dip switches or potentiometers, or require special configuration for standard Plug n' Go applications. The control units will include the following features:

1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.
3. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device ID's from highest to lowest.
4. Device Status LEDs to indicate:

    a. Data transmission
    b. Device has power
    c. Status for each load
    d. Configuration status

5. Quick installation features including:

    a. Standard junction box mounting
    b. Quick low voltage connections using standard RJ-45 patch cable

6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:

    a. Turn on to 100%
    b. Remain off
    c. Turn on to last level

7. Each load shall be configurable to operate in the following sequences based on occupancy:

    a. Auto-on/Auto-off (Follow on and off)
    b. Manual-on/Auto-off (Follow off only)

8. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.
9. BACnet object information shall be available for the following objects:

    a. Load status
    b. Electrical current
    c. Total watts per controller
    d. Schedule state – normal or after-hours

e. Demand response control and cap level
f. Room occupancy status
g. Total room lighting and plug loads watts
h. Total room watts/sq ft
i. Force on/off all loads

10. UL 2043 plenum rated
11. Manual override and LED indication for each load
12. Dual voltage (120/277 VAC, 60 Hz), or 347 VAC, 60 Hz (selected models only). 120/277 volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347 volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.
13. Zero cross circuitry for each load
14. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.

B. On/Off Room Controllers shall include:

1. One or two relay configuration.
2. Efficient 150 mA switching power supply.
3. Three RJ-45 DLM local network ports with integral strain relief and dust cover.
4. WattStopper product numbers: LMRC-101, LMRC-102.

C. On/Off/Dimming enhanced Room Controllers shall include:

1. Real time current monitoring.
2. Multiple relay configurations.

D. ONE, TWO OR THREE RELAYS (LMRC-21X series)

E. ONE OR TWO RELAYS (LMRC-22X series)

1. Efficient 250 mA switching power supply.
2. Four RJ-45 DLM local network ports with integral strain relief and dust cover.
3. One dimming output per relay.

a. 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series).
b. Line Voltage, Forward Phase Dimming - Where indicated, one forward phase control line voltage dimming output per relay for control of compatible two-wire or three-wire ballasts, LED drivers, MLV, forward phase compatible ELV, neon/cold cathode and incandescent loads. (LMRC-22x series).
c. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.
d. The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.

e. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
f. Calibration and trim levels must be set per output channel.
g. Devices that set calibration or trim levels per controller are not acceptable.
h. All configuration shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.

4. Each load shall have an independently configurable preset on level for Normal Hours and After Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After Hours events.
5. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.
6. The following dimming attributes may be changed or selected using a wireless configuration tool:

a. Establish preset level for each load from 0-100%
b. Set high and low trim for each load
c. Set lamp burn in time for each load up to 100 hours

7. Override button for each load provides the following functions:

a. Press and release for on/off control
b. Press and hold for dimming control

8. WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMRC-221, LMRC-222

F. Plug Load Room Controllers shall include:

1. One relay configuration with additional connection for unswitched load.
2. Configurable additive time delay to extend plug load time delay beyond occupancy sensor time delay (e.g. a 10 minute additive delay in a space with a 20 minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).
3. Factory default operation is Auto-on/Auto-off, based on occupancy.
4. Real time current monitoring of both switched and un-switched load (LMPL-201 only).
5. Efficient switching power supply

a. 150mA (LMPL-101)
b. 250mA (LMPL-201)

6. RJ-45 DLM local network ports

a. Three RJ-45 ports (LMPL-101)
b. Four RJ-45 ports (LMPL-201)

7. WattStopper product numbers: LMPL-101, LMPL-201.

2.8 DLM LOCAL NETWORK (Room Network)

A. The DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.

B. Features of the DLM local network include:

1. Plug n' Go® automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.
3. Push n' Learn® configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

C. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.

D. If manufacture's pre-terminated Cat5e cables are not used for the installation, the contractor is responsible for testing each cable following installation and supplying manufacturer with test results.

E. WattStopper Product Number: LMRJ-Series.

2.9 DLM SEGMENT NETWORK (Room to Room Network)

A. The segment network shall be a linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.

1. Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.
2. Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate "in" and "out" terminations, for segment network connections.
3. The segment network shall utilize 1.5 twisted pair, shielded, cable supplied by the lighting control manufacturer. The maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30 pf/ft and have a characteristic impedance of 120 Ohms.
4. Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.

5. Substitution of manufacturer-supplied cable must be pre-approved: Manufacturer will not certify network reliability, and reserves the right to void warranty, if non-approved cable is installed, and if terminations are not completed according to manufacturer's specific requirements.
6. Segment networks shall be capable of connecting to BACnet-compliant BAS (provided by others) either directly, via MS/TP, or through NB-ROUTERs, via BACnet/IP or BACnet/Ethernet. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.

B. WattStopper Product Number: LM-MSTP, LM-MSTP-DB

2.10 CONFIGURATION TOOLS

A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.

B. Features and functionality of the wireless configuration tool shall include but not be limited to:

1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.
3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.
4. Save up to eight occupancy sensor setting profiles, and apply profiles to selected sensors.
5. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.
7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
8. Verify status of building level network devices.

C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100.

2.11 NETWORK BRIDGE

A. The network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.

1. The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.

2. Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.
3. The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:

    a. Read/write the normal or after hours schedule state for the room
    b. Read the detection state of each occupancy sensor
    c. Read the aggregate occupancy state of the room
    d. Read/write the On/Off state of loads
    e. Read/write the dimmed light level of loads
    f. Read the button states of switches
    g. Read total current in amps, and total power in watts through the room controller
    h. Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings
    i. Activate a preset scene for the room
    j. Read/write daylight sensor fade time and day and night setpoints
    k. Read the current light level, in footcandles, from interior and exterior photosensors and photocells
    l. Set daylight sensor operating mode
    m. Read/write wall switch lock status
    n. Read watts per square foot for the entire controlled room
    o. Write maximum light level per load for demand response mode
    p. Read/write activation of demand response mode for the room
    q. Activate/restore demand response mode for the room

B. WattStopper product numbers: LMBC-300.

2.12 EMERGENCY LIGHTING CONTROL DEVICES

A. Emergency Lighting Control Unit – A UL 924 listed device that monitors a switched circuit providing normal lighting to an area. The unit provides normal ON/OFF control of emergency lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features include:

1. 120 volts, 60 Hz, 20 amp driver rating
2. Push to test button
3. Auxiliary contact for remote test or fire alarm system interface

B. WattStopper Product Numbers: ELCU-100, ELCU-200.

PART 3 – EXECUTION

3.1 CONTRACTOR INSTALLATION AND SERVICES

A. Contractor to install all devices and wiring in a professional manner. All line voltage connections to be tagged to indicate circuit and switched legs.

B. Contractor to install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation, and shall supply the lighting controls manufactuerer with test results. Contractor to install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.

C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, contractor shall test all devices to ensure proper communication.

D. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.

1. Adjust time delay so that controlled area remains lighted while occupied.

E. Provide written or computer-generated documentation on the configuration of the system including room by room description including:

1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
3. Load Parameters (e.g. blink warning, etc.)

F. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity.

3.2 FACTORY SERVICES

A. Upon completion of the installation, the manufacturer's factory authorized representative shall start up and verify a complete fully functional system.

B. The electrical contractor shall provide both the manufacturer and the electrical engineer with three weeks written notice of the system start up and adjustment date.

C. Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

END OF SECTION 260943

SECTION 26 23 23

SINGLE-PHASE CENTRAL BATTERY INVERTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications and supplements, of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor's Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect, and Owner's Representative by the Contractor.

B. All items shall be listed by Underwriter’s Laboratories and shall bear the U.L. label.

C. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

D. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the Contractor.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Central Battery Inverter System: UL 924 and UL 1778 listed.

G. Comply with NFPA 70 and NFPA 101.

1.3 SUMMARY

A. This Section includes fast-transfer single-phase central battery inverters with the following features:

1. Input circuit breaker.
2. Output distribution section.
3. Internal maintenance bypass/isolation switch.
4. Multiple output voltages.
5. Emergency-only circuits.
6. Remote monitoring provisions.

1.4 DEFINITIONS

A. LCD: Liquid-crystal display.

B. LED: Light-emitting diode.

C. THD: Total harmonic distortion.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Electrical ratings, including the following:

a. Capacity to provide power during failure of normal utility power.
b. Inverter voltage regulation and THD of output current.
c. Rectifier data.
d. Transfer time of transfer switch.
e. Data for optional features.

2. Transfer switch.
3. Inverter.
4. Battery charger.
5. Batteries.
6. Battery monitoring.
7. Battery-cycle warranty monitor.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, components, and location and identification of each field connection. Show access, workspace, and clearance requirements; details of control panels; and battery arrangement.

1. Wiring Diagrams: Detail internal and interconnecting wiring; and power, signal, and control wiring.
2. Elevation and details of control and indication displays.
3. Output distribution section.

C. Manufacturer Seismic Qualification Certification: Submit certification that central battery inverter equipment will withstand seismic forces defined for Seismic Design Category D. Include the following:

1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Manufacturers' quality-control tests reports.

E. Operation and Maintenance Data: For central battery inverter equipment to include in emergency, operation, and maintenance manuals.

F. Warranty: Special warranty specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store equipment in spaces having environments controlled within manufacturers' written instructions for ambient temperature and humidity conditions for non-operating equipment.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace batteries that fail in materials or workmanship within 1-year or greater. Special warranty, applying to batteries only, applies to materials only, on a prorated basis, for the period specified.

1. Warranty Period: Include the following warranty periods, from date of Substantial Completion:

a. Premium, Valve-Regulated, Recombinant, Lead-Calcium Batteries:

1) Full Warranty: One (1) year or greater.
2) Pro-rated: 19 years.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to the Owner.

1. Fuses: One for every 10 of each type and rating, but no fewer than two (2) of each.
2. Cabinet Ventilation Filters: One complete set.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide a product by one of the following:

1. Dual-Lite, Incorporated.
2. Lithonia Lighting; Emergency Lighting Systems.
3. Myers Power products.

2.2 INVERTER PERFORMANCE REQUIREMENTS

A. Fast-Transfer Single-phase Central Battery Inverters: Automatically sense loss of normal AC supply and use a solid-state switch to transfer loads. Transfer in 0.002 second or less from normal supply to battery-inverter supply.

1. Operation: Unit supplies power to output circuits from a single, external, normal supply source. Unit automatically transfers load from normal source to internal battery/inverter source. Retransfer to normal is automatic when normal power is restored.

B. Maximum Acoustical Noise: 50 dB, "A" weighting, emanating from any component under any condition of normal operation, measured 36 inches from nearest surface of component enclosure.

2.3 SERVICE CONDITIONS

A. Environmental Conditions: Inverter system shall be capable of operating continuously in the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Ambient Temperature for Electronic Components: 0 to 40 degrees C.
2. Relative Humidity: 0 to 95 percent, noncondensing.
3. Altitude: Sea level to 4000 feet.

2.4 INVERTERS

A. Description: Solid-state type, with the following operational features:

1. Automatically regulate output voltage to within plus or minus 5 percent.
2. Automatically regulate output frequency to within plus or minus 1 Hz, from no load to full load at unity power factor over the operating range of battery voltage.
3. Output Voltage Waveform of Unit: Sine wave with maximum 10 percent THD throughout battery operating-voltage range, from no load to full load.

    a. THD may not exceed 5 percent when serving a resistive load of 100 percent of unit rating.

4. Output Protection: Current-limiting and short-circuit protection.
5. Overload Capability: 125 percent for 10 minutes; 150 percent surge.
6. Brownout Protection: Produces rated power without draining batteries when input voltage is down to 75 percent of normal
7. Capability to drive loads with power factors ranging from 0.5 lagging to 0.5 leading.
8. Electrical efficiency exceeding 90%.

2.5 BATTERY CHARGER

A. Description: Solid-state, automatically maintaining batteries in fully charged condition when normal power is available. With LED indicators for "float" and "high-charge" modes.

2.6 BATTERIES

A. Description: Premium, valve-regulated, recombinant, lead-calcium batteries capable of sustaining full-capacity output of inverter unit for minimum of 90 minutes.

2.7 ENCLOSURES

A. NEMA 250, Type 1 steel cabinets with access to components through hinged doors with flush tumbler lock and latch.

B. Finish: Manufacturer's standard baked-enamel finish over corrosion-resistant primer treatment.

2.8 SEISMIC REQUIREMENTS

A. Central battery inverter assemblies, subassemblies, components, fastenings, supports, and mounting and anchorage devices shall be designed and fabricated to withstand Seismic Design Category D 4 forces.

2.9 CONTROL AND INDICATION

A. Description: Group displays, indications, and basic system controls on common control panel on front of central battery inverter enclosure.

B. Minimum displays, indicating devices, and controls shall include those in lists below. Provide sensors, transducers, terminals, relays, and wiring required to support listed items. Alarms shall include an audible signal and a visual display.

C. Indications: Plain-language messages on a digital LCD or LED.

1. Quantitative Indications:

    a. Input voltage.
    b. Input current.
    c. System output voltage.
    d. System output current.
    e. System output frequency.
    f. DC bus voltage.
    g. Battery current and direction (charge/discharge).
    h. Elapsed time-discharging battery.

2. Basic Status Condition Indications:

    a. Normal operation.
    b. Load-on bypass.
    c. Load-on battery.
    d. Inverter off.
    e. Alarm condition exists.

3. Alarm Indications:

    a. Battery system alarm.
    b. Control power failure.
    c. Fan failure.
    d. Overload.
    e. Battery-charging control faulty.
    f. Input overvoltage or undervoltage.
    g. Approaching end of battery operation.
    h. Battery undervoltage shutdown.
    i. Inverter fuse blown.
    j. Inverter overtemperature.
    k. Static bypass transfer switch overtemperature.

l. Inverter power supply fault.
m. Inverter output overvoltage or undervoltage.
n. System overload shutdown.
o. Inverter output contactor open.
p. Inverter current limit.

4. Controls:

a. Inverter on-off.
b. Start.
c. Battery test.
d. Alarm silence/reset.
e. Output-voltage adjustment.

D. Dry-form "C" contacts shall be available for remote indication of the following conditions:

1. Inverter on battery.
2. Inverter on-line.
3. Inverter load-on bypass.
4. Inverter in alarm condition.
5. Inverter off (maintenance bypass closed).

E. Include the following minimum indicator array:

1. Ready, normal-power on light.
2. Charge light.
3. Inverter supply load light.
4. Battery voltmeter.
5. AC output voltmeter with minimum accuracy of 2 percent of full scale.
6. Load ammeter.
7. Test switch to simulate AC failure.

2.10 OPTIONAL FEATURES TO BE FURNISHED

A. Multiple Output Voltages: Supply unit branch circuits at different voltage levels if required. Transform voltages internally as required to produce indicated output voltages.

B. Maintenance Bypass/Isolation Switch: Switch is interlocked so it cannot be operated unless static bypass transfer switch is in bypass mode. Switch provides manual selection among the following three conditions without interrupting supply to the load during switching:

1. Full Isolation: Load is supplied, bypassing central battery inverter system. Normal AC input circuit, static bypass transfer switch, and central battery inverter load terminals are completely disconnected from external circuits.
2. Maintenance Bypass: Load is supplied, bypassing central battery inverter system. Central battery inverter AC supply terminals are energized to permit operational checking, but system load terminals are isolated from the load.

3. Normal: Normal central battery inverter AC supply terminals are energized and the load is supplied either through static bypass transfer switch and central battery inverter rectifier-charger and inverter or through battery and inverter.

2.11 OUTPUT DISTRIBUTION SECTION

A. Panelboard: Comply with Division 26 Section "Panelboards" except provide assembly integral to equipment cabinet

2.12 SYSTEM MONITORING AND ALARMS

A. Remote Status and Alarm Panel: Labeled LEDs on panel faceplate shall indicate five (5) basic status conditions. Audible signal indicates alarm conditions. Silencing switch in face of panel silences signal without altering visual indication.

1. Cabinet and Faceplate: Surface or flush mounted to suit mounting conditions indicated.

B. Provisions for Remote Computer Monitoring: Communication module in unit control panel provides capability for remote monitoring of status, parameters, and alarms specified in Part 2 "Control and Indication" Article. Remote computer and connecting signal wiring will be provided by Owner. Include the following features:

1. Connectors and network interface units or modems for data transmission via RS-232 link.
2. Software shall be designed to control and monitor inverter system functions and to provide on-screen explanations, interpretations, diagnosis, action guidance, and instructions for use of monitoring indications and development of reports. Include capability for storage and analysis of power-line transient records. Software shall be compatible with the operating system and configuration of Owner-furnished computers.

C. Battery Ground-Fault Detector: Initiates alarm when resistance to ground of positive or negative bus of battery is less than 5000 ohms.

1. Annunciation of Alarms: At inverter system control panel.

D. Battery-Cycle Warranty Monitoring: Electronic device, acceptable to battery manufacturer as a basis for warranty action, for monitoring charge-discharge cycle history of batteries covered by cycle-life warranty.

1. Basic Functional Performance: Automatically measures and records each discharge event, classifies it according to duration category, and totals discharges according to warranty criteria, displaying remaining warranted battery life on integral LCD.
2. Additional monitoring functions and features shall include the following:

a. Measuring and recording of total voltage at battery terminals; providing alarm for excursions outside proper float voltage level.
b. Monitoring of ambient temperature at battery and initiating an alarm if temperature deviates from normally acceptable range.

c. Keypad on device front panel provides access to monitored data using front panel display.
d. Alarm contacts arranged to provide remote alarm for abnormal battery voltage or battery temperature.
e. Memory device to store recorded data in nonvolatile electronic memory.
f. RS232 port to permit downloading of data to a portable personal computer.
g. Modem to make measurements and recorded data accessible to remote personal computer via telephone line. Computer will be provided by Owner.

2.13 MANUFACTURER QUALITY CONTROL

A. Factory test complete inverter system, including battery, before shipment. Include the following:

1. Functional test and demonstration of all functions, controls, indicators, sensors, and protective devices.
2. Full-load test.
3. Transient-load response test.
4. Overload test.
5. Power failure test.

B. Test results. Include the following data:

1. Description of input source and output loads used. Describe actions required to simulate source load variation and various operating conditions and malfunctions.
2. List of indications, parameter values, and system responses considered satisfactory for each test action. Include tabulation of actual observations during test.
3. List of instruments and equipment used in factory tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment will be installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install system components on concrete base and attach by bolting.

1. Design each fastener and support to carry load indicated by Seismic Design Category D requirements.
2. Concrete Bases: 4 inches high, reinforced, with chamfered edges. Extend base no more than 3 inches in all directions beyond the maximum dimensions of switchgear unless otherwise indicated or unless required for seismic anchor support.
3. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
5. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

B. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70.

3.3 CONNECTIONS

A. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams, unless otherwise indicated.

B. Ground equipment according to Division 26 Section "Grounding and Bonding."

1. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping systems as indicated; comply with NFPA 70.

C. Connect wiring according to Division 26 Section "Wire and Cable."

3.4 IDENTIFICATION

A. Identify equipment and components according to Division 26 Section "Electrical Identification."

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Inspect interiors of enclosures for integrity of mechanical and electrical connections, component type and labeling verification, and ratings of installed components.
2. Test manual and automatic operational features and system protective and alarm functions.
3. Test communication of status and alarms to remote monitoring equipment.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Verify that central battery inverter is installed and connected according to the Contract Documents.

C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 26 Sections.

D. Complete installation and startup checks according to manufacturer's written instructions.

3.7 ADJUSTING AND CLEANING

A. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

B. Install new filters in each equipment cabinet within 14 days from date of Substantial Completion.

3.8 DEMONSTRATION AND DOCUMENTATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain central battery inverters for a minimum of (4) four hours.

B. Provide manufacturer’s Operation and Maintenance manuals to the Owner’s maintenance personnel at project close-out.

END OF SECTION 262323

SECTION 26 24 13

SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc.(UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Architect, Engineer, and Owner’s Representative by the Contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Switchboards
2. Overcurrent protection
3. Instrumentation
4. Dimensions, weights, ratings, and layouts
5. Device settings and trip ratings

PART 2 - PRODUCTS

2.1 Switchboards shall be factory assembled, dead-front, metal enclosed, self-supporting floor standing sections as noted in the construction documents.

2.2 Vertical sections shall contain overcurrent protective devices including circuit breakers and fuses and shall be nominally 90" in height.

2.3 Switchboard finish shall be baked enamel factory paint of manufacturer's standard color.

2.4 Provide front accessibility for wireways on each side of overcurrent protective devices for entire height of section. Provide welded steel framework with screw covers removable from the front; covers may be hinged.

2.5 All bussing shall be silver-coated copper (maximum 1000A/square inch current density) with ratings as indicated in the construction documents.

2.6 Switchboard, bussing, and devices shall be fully-rated for the available short circuit current as determined by the Contractor's short circuit study (see 2.16 below), inclusive of all motor contribution and utility contribution. The minimum AIC ratings of the equipment may exceed those indicated on the construction documents, due to the results of the Contractor's short circuit study. The Contractor shall include all study costs and resultant equipment costs during bidding. The Contractor may provide series-rated equipment, fully compliant with all NEC requirements and the short circuit study, but shall not provide series-rated equipment without explicit written permission from the Engineer.

2.7 Switchboards shall be equipped with lifting eyes.

2.8 Switchboards shall be suitable for the environment in which they are located and shall be NEMA 1, indoor, and rated for Seismic Design Category D, unless noted otherwise on the construction documents.

2.9 Main circuit breakers shall be provided and shall be insulated case solid-state (LSIG) trip type with ratings as noted. Main breakers shall be 100% rated devices.

2.10 Main circuit breaker shall be individually mounted, unless noted otherwise.

2.11 Main circuit breaker shall have maximum closing time of five (5) cycles, three (3) cycles upon opening.

2.12 Main circuit breaker shall have field-replaceable trip plugs.

2.13 Distribution circuit breakers shall be molded case type. All circuit breakers shall be bolt-on type.

2.14 Cross bussing shall be fully rated (maximum 1000A/square inch current density) for the length of the switchboard.

2.15 Instrumentation shall be provided where noted. Utility company metering shall be provided in accordance with the serving utility company requirements.

2.16 The Contractor shall contract a California Registered Professional Electrical Engineer to furnish and submit a coordination/short circuit study and ARC Flash Study (using SKM “Power Tools” software or equal) for the entire system provided including long time, short time, instantaneous, and ground fault settings.

2.17 Provide permanently adhered “bakelite” labels indicating the identification of each device on the switchboard adjacent to the device and visible on the enclosure exterior.

2.18 Provide a ground bus in each switchboard section with connecting ground bonds between sections. Ground bus shall be rated at 30% of the incoming capacity.

2.19 Rodent-proof ventilation as required to maintain allowable temperature rise at rated capacity.

2.20 Acceptable manufacturers shall be Siemens, Eaton, or approved equal.

PART 3 - EXECUTION

3.1 Installation method of switchboards shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Install all switchboards in accordance with the manufacturer’s recommendations and requirements.

3.3 Coordinate switchboard location and size with architectural and interior drawings. Coordinate with other trades to identify conflicts with switchboard locations and notify the Engineer of any conflicts.

3.4 Coordinate switchboard size with concrete housekeeping pads.

3.5 Check all connections, phase rotation, ground resistance and insulation resistance levels.

3.6 Ground fault protective devices shall be tested by an approved third party testing agency and a written report submitted with the operation manual for review.

3.7 Test all switchboards and overcurrent protection devices for voltage level, continuity, ground fault, and short circuits.

3.8 Install all switchboards plumb and square to structure and adjacent surfaces.

3.9 Connect and inspect all ground bonds prior to energizing switchboard.

3.10 Demonstrate the proper operation of all ground fault protective devices.

3.11 Clean all switchboard interiors and exteriors to be free of dirt, dust and debris prior to handing over to Owner. Touch up scratched paint and finishes as necessary.

3.12 Adjust and set all devices for proper operation. Set all protective devices as per the written report recommendations.

3.13 Install ARC Flash labeling on switchboards and panelboards per NFPA 70E.

END OF SECTION 262413

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractors Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc.(UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Architect, Engineer, and Owner’s Representative by the Contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the UL label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Panelboards
2. Overcurrent protection, bus capacity, main ratings, AIC rating
3. Mounting, enclosure, dimensions
4. Voltage, ratings, and phases
5. Device settings, trip ratings, and layout

PART 2 - PRODUCTS

2.1 Panelboards shall be factory assembled, dead-front, metal enclosed, wall mounted type as noted in the construction documents.

2.2 Panelboards shall be rated 600VAC and shall not exceed 400A current capacity, unless specifically noted on the construction documents.

2.3 Panelboard finish shall be baked enamel factory paint of manufacturer's standard color.

2.4 Provide front accessibility for wireways on each side of overcurrent protective devices for entire height of panelboard.

2.5 All bussing shall be silver-plated copper with ratings as indicated in the construction documents.

2.6 Panelboard bussing and devices shall be fully-rated for the available short circuit current as determined by the Contractor's short circuit study (see requirements in Section 26 24 13, Part 2, 2.6).

2.7 Enclosures shall be galvanized sheet steel cabinet type with hinged and lockable doors, dead front, and permanently adhered identification labels on the front.

2.8 Panelboards shall be suitable for the environment in which they are located and shall be NEMA 3R, outdoor, unless noted otherwise on the construction documents.

2.9 Circuit breakers shall be molded case type; all circuit breakers shall be bolt-on type.

2.10 Arc fault circuit interrupting (AFCI) circuit breakers shall be provided for all dwelling unit bedroom receptacle circuits. AFCI circuit breakers shall be manufactured and listed to UL Standard 1699.

2.11 Main lugs shall be anti-turn solderless pressure type for use with copper conductors.

2.12 Instrumentation shall be provided where noted.

2.13 Enclosures, panel interiors, and devices shall be of one manufacture.

2.14 Provide a typewritten panel schedule located in a sleeve on the interior of the panelboard door indicating loads and areas connected to each circuit.

2.15 Provide a ground bus in each panelboard.

2.16 Acceptable manufacturers shall be Siemens, Eaton, or approved equal.

2.17 The Contractor shall contract a California Registered Professional Electrical Engineer to furnish and submit a coordination/short circuit study and ARC Flash Study (using SKM “Power Tools” software or equal) for the entire system provided including long time, short time, instantaneous, and ground fault settings.

2.18 All panels will have bolt on breaker, copper buss, and full size neutral-ground bar.

2.19 Main switch and all circuit breakers will be supplied with a name plate adjacent to each device as specified under Marking and Name plates.

PART 3 - EXECUTION

3.1 Installation method of panelboards shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Install all panelboards in accordance with the manufacturer’s recommendations and requirements.

3.3 Coordinate panelboard location and size with architectural and interior drawings. Coordinate with other trades to identify conflicts with panelboard locations and notify the Engineer of any conflicts.

3.4 Fasten panelboards securely to structural wall or surface to Seismic Design Category D requirements. Panelboards shall be mounted no higher than 6'0" to the highest device from finished floor and no lower than 24" above finished floor. Provide panel skirts where noted.

3.5 Provide a minimum of five (5) empty ¾” conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as “SPARE”.

3.6 Check all connections, phase rotation, ground resistance and insulation resistance levels.

3.7 Complete the panel schedule card and place in the sleeve on the interior of the panelboard door.

3.8 Test all panelboards and overcurrent protection devices for voltage level, continuity, ground fault, and short circuits.

3.9 Install all panelboards plumb and square to structure and adjacent surfaces.

3.10 Connect and inspect all ground bonds prior to energizing panelboard.

3.11 Demonstrate the proper operation of all ground fault protective devices.

3.12 Clean all panelboard interiors and exteriors prior to handing over to Owner. Touch up scratched paint and finishes as necessary.

3.13 Adjust and set all devices for proper operation.

3.14 Install ARC Flash labeling on switchboards and panelboards per NFPA 70E.

3.15 Supply 25% spare breaker space in all panels and copper bus.

3.16 Provide 25% more ampacity for electric panels above calculated load requirements.

3.17 Provide a ¾ inch conduit for each three spares or spaces in all flush mounted power or lighting panel boards. Route conduit to accessible space above the ceiling.

END OF SECTION 262416

SECTION 26 27 26

WIRING DEVICES AND CONNECTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter’s Laboratories and shall bear the UL label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Receptacles
2. Switches
3. Wiring devices
4. Accessories

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. Wiring devices shall be UL listed and suitable for the application.

B. Devices shall be color coded per the system to which they are connected: normal power shall be white; emergency power shall be red; dedicated outlets shall be grey; unless otherwise noted on the construction documents.

C. Receptacles shall be heavy duty, screw type, side wired, 120V, 20A, duplex type, unless noted otherwise on the construction documents. Verify NEMA configuration with construction documents.

D. Weathertight receptacles shall be gasketed in cast metal boxes with cast metal coverplates. Coverplates shall have spring-loaded in-use hinged covers.

E. Ground fault interrupting receptacles shall be duplex type and capable of detecting a leaking current of 5mA.

2.2 TOGGLE SWITCHES

A. Toggle wall switches shall be quiet AC type, rated 120/277V, 20A and UL listed for the application.

B. Switches shall be single pole, double throw with white finish unless noted otherwise.

2.3 WALL BOX DIMMERS

A. Wall box dimmers shall be UL listed and suitable for the application.

B. Devices shall be white unless otherwise noted.

C. Device shall be noted for minimum 1000W, unless otherwise noted.

D. Device shall be available in single-pole and 3-way configurations.

E. Device shall be Leviton 'Touch Point' series, or equal by Lutron.

2.4 COVERPLATES

A. Single, combination coverplates shall be used at all ganged device locations.

B. Provide white plastic coverplates with white screws in all office areas. Provide stainless steel coverplates with matching screws in janitorial, mechanical, laboratory, process, manufacturing, and clean room areas or as noted on the construction documents. Provide weatherproof in-use covers for all exterior locations.

C. Provide labeled plates as noted on the construction documents.

D. Provide labeled plates at all receptacles with circuit and panel designation. Labeling method shall utilize clear adhesive printed labels with black bold letters.

2.5 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers shall be Arrow Hart, Hubbell, Leviton, or Pass and Seymour.

PART 3 - EXECUTION

3.1 Installation method of wiring devices shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Installation of receptacles in dwelling unit bedrooms shall comply with NEC section 210-12(b) and shall be protected by an arc fault circuit interrupter.

3.3 Install all devices in accordance with the manufacturer's recommendations and requirements.

3.4 Contractor shall verify installation orientation of duplex outlets (ground pin up or down) with Owner's representative prior to installation.

3.5 Coordinate device mounting height, location and type with architectural and interior drawings. Coordinate with other trades to identify conflicts with device locations and notify the Engineer of any conflicts.

3.6 Install devices only in clean boxes.

3.7 Install all trim rings and coverplates in coordination with other trades and their installation schedules.

3.8 Tighten and inspect all connections prior to covering devices and reconnect or repair wiring as necessary.

3.9 Test all devices for voltage level, continuity, ground fault, and short circuits.

3.10 Install all devices plumb and square to structure and adjacent surfaces.

3.11 Connect and inspect all ground bonds prior to covering device.

3.12 Demonstrate the proper operation of all ground fault interrupting devices.

END OF SECTION 262726

SECTION 26 28 16

CIRCUIT AND MOTOR DISCONNECTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including the regulations of serving utilities and any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractor’s Association (NECA)
9. National Electrical Manufacturer’s Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriter’s Laboratories, Inc. (UL)
13. International Building Code(IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the immediate attention of the Engineer, Architect and Owner’s Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the UL label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

1.3 SUBMITTALS

A. Submit shop drawings per Section 26 05 00 for review including the following:

1. Voltage and current ratings
2. NEMA enclosure type
3. Horsepower and fault current rating
4. Dimensions
5. Fuse type and class

PART 2 - PRODUCTS

2.1 Disconnects shall NEMA 1, indoor type, or rated for the locations in which they are installed as noted on the construction documents.

2.2 Disconnects shall be UL listed and suitable for the application.

2.3 Disconnects in exterior, wet, cold, warm, or hot environments shall be raintight, have raintight hubs, and be rated NEMA 3R.

2.4 Disconnects shall be heavy-duty type, rated 600V with current capacity as noted on the construction documents. Verify NEMA configuration with construction documents.

2.5 Disconnects shall have hinged, lockable, dead-front doors with permanently marked ON/OFF indicators. Enclosures shall be baked enamel factory painted steel with conduit knockouts.

2.6 Disconnects shall be operated by a handle accessible from the exterior of the enclosure. Handles shall have provision to be padlocked in the OFF position.

2.7 All current carrying parts shall be high conductivity copper designed to carry rated load without damage from heat and plated to resist corrosion.

2.8 Switch mechanism shall be a quick-make, quick-break type such that the operation of the contact is restrained by the handle during the closing or opening operation.

2.9 Switches shall have a minimum fault current rating of 200,000A RMS.

2.10 All switches shall be fused unless specifically noted otherwise.

2.11 The disconnect door cover shall have an interlocking mechanism to prevent opening the cover when the switch is in the ON position.

2.12 Fuses serving motor loads shall be Class L and Class RK1, 250V and 600V, time delay, dual element unless noted otherwise on the construction documents.

2.13 Fuses serving non-motor loads shall be Class L and Class RK1, 250V and 600V, fast acting, dual element unless noted otherwise on the construction documents.

2.14 Provide built-in fuse pullers.

2.15 Acceptable manufacturers shall be General Electric, Siemens, Eaton, or Square D. Fuses shall be Gould-Shawmut or Bussman.

PART 3 - EXECUTION

3.1 Installation method of disconnects shall comply with the latest enforced edition of the National Electrical Code and the authority having jurisdiction.

3.2 Install all disconnects in accordance with the manufacturer’s recommendations and requirements.

3.3 Coordinate disconnect mounting height, location and type with architectural, mechanical, and interior drawings. Coordinate with other trades to identify conflicts with device locations and notify the Engineer of any conflicts. Mount switches 42" above finished floor unless noted otherwise.

3.4 Provide suitable galvanized metal strut framework where no wall or structure is available for the mounting of disconnects.

3.5 Provide flexible conduit connections for disconnects mounted to strut framework, motors, or vibrating equipment.

3.6 Tighten and inspect all connections and reconnect or repair wiring as necessary.

3.7 Test all disconnects for voltage level, continuity, ground fault, and short circuits. Check switch mechanism operation under no load conditions prior to operating under load.

3.8 Install all disconnects plumb and square to structure and adjacent surfaces.

3.9 Provide and install all fuses sized per the equipment manufacturer’s recommendation.

3.10 Fuses will be Bussman or Gould low peak, only. Provide spare fuses in the amount of ten percent of each size and type installed, but not less than three; delivered to the Owner upon final acceptance of the project. Provide and install fuse cabinet in the electrical room for storing these extra fuses.

3.11 Install 24x18” metal frame in the electrical room and include a “one line” electrical diagram of the building.

END OF SECTION 262816

Section 26 43 13

TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

PART 1 - GENERAL REQUIREMENTS

1.1 DESCRIPTION

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 QUALITY ASSURANCE AND STANDARDS

A. All work, material or equipment shall comply with the codes, ordinances and regulations of the local government having jurisdiction, including any participating government agencies having jurisdiction.

B. All electrical work shall comply with the latest edition under enforcement, including all amendments, modifications, and supplements of the following codes and standards or other regulations which may apply:

1. American Disabilities Act (ADA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Federal Communications Commission (FCC)
5. Institute of Cable Engineers Association (ICEA)
6. Institute of Electrical and Electronic Engineers (IEEE)
7. International Electrotechnical Commission (IEC)
8. Local Code Enforcement Agency Requirements
9. National Electrical Code (NEC)
10. National Electrical Contractor’s Association (NECA)
11. National Electrical Manufacturer’s Association (NEMA)
12. National Electrical Testing Association (NETA)
13. National Fire Protection Association (NFPA)
14. Underwriter’s Laboratories, Inc. (UL)
15. International Building Code (IBC)

No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. Any conflicts or changes required to the contract documents in order to obtain compliance with applicable codes shall be brought to the im-

mediate attention of the Architect, Engineer, and Owner's Representative by the contractor.

C. All items shall be listed by Underwriter's Laboratories and shall bear the U.L. label.

D. Equipment shown to scale is approximate only and based upon a general class of equipment specified. The Contractor shall verify all dimensions and clearances prior to commencement of work.

E. The Contractor shall verify all points of connection with the manufacturer's requirements, instructions, or recommendations prior to installation. The actual dimensions, weights, clearance requirements and installation requirements shall be verified and coordinated by the contractor.

F. Source of Quality Control:

1. System shall be UL listed as a complete system under UL Standard for Surge Protective Devices (SPD) and the rating shall be permanently affixed to the SPD.

G. Factory Tested:

1. The specified system shall be thoroughly factory tested before shipment. Testing of each system shall include but shall not be limited to quality control checks, Hi-Pot tests at two times rated voltage plus 1000 volts per UL requirements and operational and calibration tests.
2. The products shall be capable of surviving 1000 sequential surges of 10,000A without failure.
3. The SPD shall be provided with computer generated graphs or oscillograms demonstrating the SPD clamping voltage and operability.

1.3 SUBMITTALS

A. Submit the following for approval in accordance with the Section 26 05 00 and with the additional requirements as specified for each:

1. Catalog cuts of the SPD unit.
2. Shop drawings shall be provided by the manufacturer which show unit dimensions, weights, components and connection locations, mounting provisions, connection details and wiring diagram.
3. Documentation of specified system's UL listed and clamping voltage ratings shall be included as required product data submittal information.
4. A list of recommended spare parts shall be supplied at the customer's request.
5. The manufacturer shall furnish an installation manual with installation, start-up and operating instructions for the specified system.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Mark each item in accordance with applicable reference standard.

B. Ship each unit securely packaged and labeled for safe handling and to avoid damage.

C. Store products in secure and dry storage facility.

1.5 OPERATION AND MAINTENANCE MANUAL

A. At the completion of the project submit Operations and Maintenance Manual.

1.6 WARRANTY

A. The manufacturer shall provide a full five year warranty from date of shipment against any part failure when installed in compliance with manufacturer's written instructions, UL listing requirements, and any applicable national or local electrical codes.

1.7 MANUFACTURER

A. Acceptable manufacturers:

1. Current Technology
2. Liebert
3. LEA

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Operating Temperature range shall be -10 to +60C (+14 to +140F)

B. Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.

C. The audible noise level of the specified system shall be less than 45 dBA at 5 feet.

2.2 ELECTRICAL REQUIREMENTS

A. The nominal system operating voltage shall be:

1. 480Y/277V 3PH 4W
2. 208Y/120V 3PH 4W

B. The SPD maximum continuous operating voltage (MCOV) shall be greater than 115% of the nominal system operating voltage to ensure the ability of the system to withstand temporary RMS overvoltage conditions.

C. The operating frequency range of the system shall be at least 47 to 63 Hertz.

D. The SPD shall provide protection modes as follows:

1. Line to Ground
2. Neutral to Ground
3. Line to Neutral

E. The SPD surge current capacity, based on an 8 x 20 microsecond shall be a minimum of 150kA per phase. A balanced surge current shall also be applied Neutral to Ground and Line to Neutral where applicable.

F. The maximum UL 1449 3rd Edition clamping voltage ratings for each of the specified protection modes shall not exceed 800 Volts L-L for 208Y/120V or 480Y/277V systems.

G. The specified system shall be internally fused at the component level with the fuses' lxlxT capable of allowing the suppressor's maximum rated transient current to pass through the suppressors without fuse operation. If the rated lxlxT characteristic of the fusing is exceeded, the fusing shall open in less than one millisecond and be capable of interrupting up to 300kA symmetrical fault current. This overcurrent protection circuit shall be monitored and provide indication of suppression operability or failure.

H. The SPD system shall provide a joule rating that meets or exceeds the requirements of ANSI/IEEE C-62.41 Category C delivery capability.

1. The system shall provide noise attenuation for electrical line noise of 40 dB.

2.3 COMPONENTS

A. The system shall be a symmetrically balanced, metal oxide varistor (MOV) array system, constructed using surge current diversion modules, each rated for at least 25kA of surge current capacity based on the standard 8 x 20 microsecond waveform.

B. Each module shall be capable of withstanding over 100 pulses of the 10 kA IEEE C-62.41 Category C surge current without degradation of clamping voltage.

C. The module shall consist of multiple gap-less metal oxide varistors, with each MOV individually fused. The modules shall be designed and constructed in a manner which ensures reasonable MOV surge current sharing. No gas tubes or silicon avalanche diodes shall be used.

D. The status of each varistor shall be monitored and green LED shall be illuminated if the module is in full working order. When module performance is degraded, such as if one or more fuses or varistors have failed, the LED shall indicated a failed module.

2.4 CONNECTORS

A. Terminals shall be provided for all of the necessary and ground connections.

B. The terminals shall accommodate wire size of #14 to #2/0 AWG for two conductors per required connection, thereby allowing a Kelvin connection of the SPD which minimizes the actual

clamped voltage at the protected circuit for SPD up to 150A. Above 150A, the units shall use standard parallel wiring techniques.

2.5 INTERNAL CONNECTIONS

A. All surge current diversion module intra-unit connections shall be by the way of low impedance plated busbars. No small gauge round wire or plug-in connections shall be used as the surge current carrying conductor.

B. Surge current diversion modules shall use bolted connections to the plated busbars for reliable low impedance connections.

C. All module mounting hardware and power wiring shall be captive or remain in place when a module is removed or replaced.

2.6 ENCLOSURE

A. The specified system shall be provided in a heavy duty NEMA 12 dustight, dripight enclosure with no ventilation openings.

B. The cover of the enclosure shall be hinged on the left side and require a tool for access to internal components. A drawing pocket shall be provided inside the door for storage of unit drawings and installation/operation manual.

C. Indication of surge current module status shall be visible without opening the door.

2.7 ACCESSORIES

A. Unit Status Indicators

1. Red or green solid state indicators shall be provided on the hinged front cover to redundantly indicate unit module status. The absence of the green light and presence of the red light shall reliably indicate that one or more surge current diversion modules has failed and that service is needed to restore full operation.
2. A form C (one N.O. and one N.C.) summary alarm contact rated for at least 120 VAC and 1 ampere shall be provided for remote annunciation of unit status. The summary alarm contact shall change state if any one or more of the surge current diversion modules has failed.

B. Audible Alarm

1. The specified system shall be equipped with an audible alarm which shall be activated when any one or more of the surge current diversion modules has failed.
2. In conjunction with the audible alarm, an alarm on/off switch shall be provided to silence the alarm and an alarm push-to-test switch shall be provided to test the alarm function.
3. Both switches and the audible alarm shall be located on the unit’s hinged front cover.

C. Surge Counter

1. A surge voltage counter shall be included to totalize voltage surges which deviate from the sinewave envelope by more than 125 volts. The readout shall be at least a six digit LCD located on the unit's hinged front cover.
2. The counter shall be equipped with a battery back-up to retain memory when input power is not present.
3. A pushbutton switch on the display's faceplate shall be provided for manual counter reset.

PART 3 - EXECUTION

3.1 INSTALLATION

A. SPD devices shall not be mounted internal to panelboards or switchboards to which they are connected.

B. The installing contractor shall install the parallel SPD with short and straight conductors as practically as possible. The contractor shall twist the SPD input conductors together to reduce input conductor inductance.

C. The system shall be connected in parallel with the protected system; no series connected elements shall be used, which could constitute a single point failure.

D. The contractor shall follow the SPD manufacturer's recommended installation practices and comply with all applicable codes.

END OF SECTION 26 43 13

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 SCOPE

A. Provide labor, materials, tools, and equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the equipment of this section, as shown on the drawings and specified herein.

B. Furnish and install complete lighting systems, wired, assembled and operable, except where specifically noted otherwise, which includes but not limited to the following:

1. Luminaires
2. Lamps and ballasts
3. Mounting hardware
4. Accessories as noted

C. The materials and equipment herein specified shall be of new and furnished in accordance with the applicable standards.

D. Specifications and drawings are intended to convey the general features, function and character of the fixtures only, and do not illustrate or set forth every item or detail necessary of the work.

1.3 QUALITY ASSURANCE AND STANDARDS

A. The latest revision of the standards listed below form an integral part of this specification:

1. American Disabilities Act (ADA)

2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)

6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractors Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)
14. Illuminating Engineering Society of North America (IESNA)
15. Certified Ballast Manufacturers (CBM)
16. National Appliance Energy Conservation Amendments of 1988 (Public Law 100-357).

Materials and equipment as well as workmanship provided under this section shall conform to the highest commercial standards, and as specified and as indicated on the drawings. Fixture parts and components not specifically identified or indicated shall be made of materials most appropriate to their use or function and as such resistant to corrosion, thermal and mechanical stresses encountered in the normal application and function of the fixtures.

1.4 SUBMITTALS

A. Shop drawings for all fixtures shall be submitted and reviewed prior to fabrication. Any material produced prior to the review of shop drawings or samples, and not in conformance with the Contract Documents, shall be rejected with the Contractor bearing full responsibility and cost. Submit shop drawings per Section 26 05 00 for review, include the following:

1. Luminaires
2. Lamps
3. Ballasts
4. Photometric reports
5. Point-by-point calculations specific to the project.
6. Accessories

B. Submit shop drawings indexed, and in accordance with luminaire identification per drawings. Each item shall be tabbed, clearly identifying the catalog ordering numbers including all optional equipment specified.

C. Luminaire shop drawings shall include the following:

1. Manufacturers’ product information sheets. Photocopy of partial data sheet or drawings is not acceptable. Product information shall include the following:

a. Ballast type, manufacturer and performance characteristics
b. Lamp type, manufacturer and performance characteristics
c. Finish, frame, trim and housing type
d. Reflector system and characteristics
e. Diffuser type and characteristics
f. Weight and dimensions
g. Standard manufacturer options

h. Luminaire series and model number
i. Luminaire efficiency
j. Coefficient of utilization
k. Candlepower data table
l. Zonal lumens table
m. IES luminaire classification
n. Maintenance and operating instructions including tools required, types of cleaners to be used and suggested replacement parts list.
o. Average foot candle table.

2. Photometric data assembled in a standard IES photometric test report.

D. Lamp shop drawings shall include type, dimensions, manufacturer and operating characteristics, including but not limited to:

1. Operating voltage range
2. Color Rendering Index (CRI) value per IES standards
3. Color temperature (in Kelvin)
4. Mounting position
5. Starting temperature, indoor and outdoor
6. Starting/restrike time
7. Lamp life
8. Lamp efficiency
9. Warranty
10. Lamp base
11. Lumen rating

E. Ballast shop drawings shall include type, dimensions, manufacturer and operating characteristic including but not limited to:

1. Ballast operating temperature and voltage
2. Total harmonic distortion
3. Ballast starting/restrike time
4. Ballast efficiency factor (BEF)
5. Ballast transformation type (ie: autotransformer, preheat, instant-start, rapid start, constant wattage, reactor, trigger-start)
6. UL classification (ie: Class "P")
7. Power factor
8. Sound rating (fluorescent only)
9. NEMA rating

F. If requested by the Engineer, samples shall be submitted for final selection. Samples shall comply with the following:

1. Paint chips:

a. Samples shall be provided and approved prior to any release to manufacture.
b. Samples shall be minimum of 3"x3" and be of exact finishes.

c. Samples shall be exact representatives of the luminaires:

1) Priming process
2) Painting process
3) Baking process
4) Finish process
5) Luminaire material (i.e. sheet metal, aluminum, wood, etc)

d. Samples shall be labeled with manufacturers color call-out, as well as the paint manufacturers' call-out.

2. Fixtures:

a. Submit for approval samples called for to the Engineer when and where directed, the components marked with the name of the project, and fixture type, and part number. Fixture shall be provided with a 6' cord and plug, and specified lamp. Allow two weeks from the date of receipt for thorough examination and review by the Engineer.
b. Fixtures under the contract shall be identical with the approved sample fixture. No fixture used as a sample shall be allowed to be installed on the project.
c. In the event the submissions are disapproved, the fixtures shall be returned to the contractor to immediately make a new submission of fixture or fixtures meeting the contract requirements.
d. All charges for these shipments are to be prepaid by the Contractor.
e. Samples shall be provided and approved prior to any release to manufacture.

1.5 FACTORY TESTING

A. Luminaire testing shall be conducted by an approved independent testing laboratory.

B. Luminaire tests shall be reported in accordance with Illuminating Engineering Society (IES) Standard Photometric Test Report.

1.6 WARRANTY

A. Contractor shall warranty equipment and installation free from defects in material and workmanship for a period of no less than (1) year from the date of project completion. This includes the fixture, its finishes and components (see ballasts below).

B. Fluorescent ballasts shall be warrenteed against defects in material and workmanship for a period of no less than (5) years for electronic ballasts, from the date of project completion regardless of the date of manufacture.

C. HID ballasts shall be warrenteed against defects in material and workmanship for a period of no less than (2) years from the date of project completion regardless of the date of manufacture.

D. LED modules and drivers shall each be warrantied against defects in material and workmanship for a period of no less than five (5) years, form the date of project completion regardless of the date of manufacture.

PART 2 - PRODUCTS

2.1 GENERAL

A. Luminaries shall bear the appropriate UL label for location, mounting position and operating conditions in which it is installed.

B. Luminaries, ballasts and lamps shall each be of the same manufacturer and of identical finish, appearance, and performance. Luminaries which are pre-lamped before shipment shall have identical lamp manufacturer. Mix and match of different lamp manufacturer shall not be acceptable.

C. Recessed ceiling mounted luminaires shall be provided with appropriate frame and trim type compatible with ceiling construction. Reference architectural plans for ceiling construction type and specifications.

D. Luminaires and devices shall be free of burrs, scratches, marks, and dents which may occur during transportation, storage or installation. Construction shall be finished to eliminate sharp edges exposed to installer and end-user.

E. Sheet metal construction of luminaires shall be of sufficient rigidity to prevent deformation during installation and typical use.

F. Cast parts and sections of a luminaire shall be smooth, free of blemishes, rust and scale and be irradiated, sandblasted and anodized.

G. All burned out lamps and ballasts shall be replaced by the end of contract prior to Architect, Owner Representative and Engineer final punchlist.

H. Trim color for indoor luminaire installation shall be as indicated on plans.

I. Enamel paint shall be baked on at a minimum 300 degrees F and have 86% reflectivity for a surface, which is to be reflective.

J. Light fixtures will be high quality, long lasting, brand name, Energy Efficient and made in the U.S.A., with easy to replace lamps. The number of different types of fixtures must be kept to a minimum and the ease of re-lamping must be a major consideration in fixture selection.

2.2 LAMPS

A. Incandescent lamps

1. Incandescent lamps below 300W shall be medium base type unless otherwise noted.
2. Incandescent lamps shall be frosted inside or as manufacturer recommended and 130V rated unless otherwise noted.
3. Low Voltage lamps MR16 shall be NFL unless otherwise noted.

B. LED (Lighting Emitting Diode) Modules

1. Unless specified on plans or in Lighting Fixture Schedule, the module color temperature shall be 3500 Kelvin (K).
2. Unless otherwise noted, modules shall have a CRI (color rendering index) of 82 or greater.
3. Rated lumen output shall be based on fixture absolute lumens as defined in LM-79 (IESNA).
4. Modules shall comply with LM-80 (IESNA).
5. LED modules shall be interchangeable without removal or replacement of heat sink or luminaire.
6. Luminaire Manufacturer to offer replacement modules that maintain rated lumen package per initial design luminaire.
7. Minimum rated life of modules shall be 50,000 hours per IESNA L70.

C. Acceptable Manufacturers

1. Halogen Lamps: Osram/Sylvania, GE or Philips.
2. LED Chips: Cree, Nichia, Philips or approved equal.

D. Fluorescent lamps

1. Unless specified on plans or in Lighting Fixture Schedule, the lamp color temperature shall be 3500 Kelvin (K).
2. Unless otherwise noted, lamps shall have a CRI (color rendering index) of 82 or greater.

E. HID lamps

1. Metal halide lamps shall be phosphor coated and universal burning position type unless otherwise noted. Metal halide lamps shall incorporate a quartz shroud around the arc tube to prevent outer jacket rupture in the event of a non-passive arc tube failure.
2. Metal halide lamps shall be of the type with a lifetime color stability within +/-200K. If not available for the type and wattage specified, metal halide lamps with the best color uniformity as per current industry standards shall be used.
3. High Pressure Sodium lamps shall be diffuse coated and universal burning position type unless otherwise noted.

F. Compact Fluorescent

1. Unless specified on plans or in Lighting Fixture Schedule, the lamp color temperature shall be 3500 Kelvin (K).
2. Unless otherwise noted, lamps shall have a CRI (color rendering index) of 82 or greater.
3. Lamp base and fixture socket shall match pin configuration.

G. Acceptable manufacturers

1. Incandescent Lamps: Osram/Sylvania, GE or Philips
2. Fluorescent Lamps: Osram/Sylvania, 800 XP series
3. Low Pressure Sodium Lamps: Osram/Sylvania or Philips
4. Metal Halide Lamps: Osram/Sylvania, GE or Philips
5. High Pressure Sodium Lamps: Osram/Sylvania, GE or Philips

H. All lamps shall be burned once installed in the fixtures for 100 hours, prior to switching or dimming.

2.3 BALLASTS

A. General

1. Ballasts shall be UL listed when installed in luminaire.
2. Ballasts shall be grounded appropriately as governed by NEC Article 410-E.
3. Ballasts shall be located within the luminaire for which it is operating unless specifically indicated on plans as remote ballast type.
4. Ballasts shall contain no PCB's in any indoor or outdoor installation unless otherwise noted.
5. Ballasts shall be rated weatherproof type where there is moisture present.
6. A permanent waterproof seal shall be factory provided where the wiring enters the ballast compartment of an outdoor luminaire installation.

B. LED Drivers

1. Shall be UL listed when installed in luminaire.
2. Drivers shall be grounded appropriately as governed by NEC Article 410-E.
3. Drivers shall be located within the luminaire for which it is operating unless specifically indicated on plans as remote ballast type.
4. Remote drivers shall be located in accessible location, within manufacturers maximum distance requirements.
5. Drivers shall be rated weatherproof type where there is moisture present.
6. A permanent waterproof seal shall be factory provided where the wiring enters the ballast compartment of an outdoor luminaire installation.
7. Drivers shall have a standard dimming protocol of 0-10V unless otherwise noted on the Luminaire Schedule.
8. Shall operate with no detectable flicker and be high power factor (95% or higher.
9. Drivers shall be marked with the manufacturer’s name, part number, supply voltage, power factor, open circuit voltage, current draw for each LED module being powered and bear all applicable UL listing on housing.
10. All drivers shall be compatible with dimming protocol of connected room controllers, panels, local controls, devices and other luminaires.

C. Acceptable Manufacturers

1. Osram/Sylvania, GE, Philips or EldoLED.

D. Fluorescent ballasts

1. Solid State Ballasts (Electronic)

a. Electronic ballasts shall meet or exceed ANSI, IEEE, and FCC standards for lamp starting and operation, electromagnetic interference, radio frequency interference suppression and line transient protection.
b. Electronic ballasts shall not interfere with other electrical equipment normal operation.
c. Electronic ballasts shall operate at a frequency of 20 to 35kHz with no detectable flicker and be high power factor (97% or higher).
d. Electronic ballasts that operate more than one lamp shall be able to maintain full output of the companion lamp(s) after failure of any combination of lamp(s).
e. Electronic ballasts shall not be affected by lamp failure nor hinder the normal life of operating lamp.
f. Electronic ballast normal case operating temperature shall not exceed 70 degrees C.
g. Rapid-start electronic ballasts shall provide soft/stable start of rapid-start lamps and maintain full cathode heat during operation.
h. Electronic ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type and bear all applicable UL listings on housing.

E. HID Ballasts

1. Autoregulator type with current crest factor of 1.6 to 1.8 and voltage regulation of 10% allowable.
2. Metal halide ballasts shall be Lead-Peak Autotransformer type with current crest factor of 1.6 to 1.8 and voltage regulation of 10% allowable.
3. High pressure sodium ballasts shall be Regulating type with voltage regulation of 10% allowable and shall meet ANSI trapezoid limitations for voltage characteristics over the life of the lamp.
4. HID ballasts shall be fused with manufacturer recommended size and type
5. HID ballasts shall bear all applicable UL listings on housing.

F. Acceptable Manufacturers

1. Solid state ballasts (electronic): Osram Sylvania or, Quicktronic, or approved equal.
2. Low-pressure sodium ballasts: Magnetek, Advance Transformer Co. or approved equal.
3. Metal halide ballasts: Magnetek, Advance Transformer Co. or approved equal.
4. High pressure sodium ballasts: Magnetek, Advance Transformer Co. or approved equal.

2.4 LUMINAIRES

A. General

1. Escutcheon plates, coverplates, and finish trim hardware shall meet flush with ceiling, floor, wall or other surfaces to which they may be mounted.

2. Luminaire construction shall allow initial installation of recessed luminaires without the presence of finish trim, diffusers or lens.
3. Lamp sockets and reflector assemblies shall be securely fastened to luminaire housing to prevent rotation, adjustment or rocking of hardware during lamping or future relamping.
4. Luminaire lenses shall be securely retained in a fashion so that relamping or accessing to luminaire will not dislodge lens.
5. Luminaire lenses and diffusers shall be free from chromatic or spherical imperfections and have thermal characteristics capable of withstanding installed lamp temperatures.
6. Pendant type luminaries shall be mounted to provide balanced construction with the use of swivel hanger. Swivel hanger shall be provided standard or ordered as accessory unless specified otherwise.
7. Bracket type luminaires shall be specifically designed for type installation which is indicated.
8. Luminaries shall be factory tested, prewired and preassembled unless otherwise specified or intended.
9. Luminaires located in direct exposure to the weather to include rain, sleet and snow shall be marked "Suitable For Wet Locations" with UL label. Luminaires located outdoors but not in direct exposure to rain shall be marked "Suitable for Damp Locations" minimum rated.
10. Where ceiling space is not accessible, luminaire housing shall provide access to luminaire junction box to comply with NEC section 370-29.
11. Luminaires shall contain an integral ballast disconnect compliant with NEC section 410.73.

B. Incandescent Luminaires

1. Recessed incandescent luminaires shall be provided with mounting frame and attached prewired junction box rated for through-wiring with 60 degree C conductors.

C. LED Luminaires

1. Luminaires shall come with manufacturer provided LED module installed.
2. All luminaires shall meet building energy code Title 24-2013 efficacy requirements.
3. Luminaire housing, driver and module shall be products of the same manufacturer.

D. Fluorescent Luminaires

1. Recessed fluorescent luminaires shall be constructed to limit ballast housing surface temperature in luminaire to 90°C with the following factors:

   a. Voltage: 277V +5%
   b. Room Ambient Temp: 25 degrees C + 5%
   c. Plenum Ambient Temp: 55 degrees C +5%
   d. Ceiling Material R Factor: 20

2. Medium BiPin type lamp socket shall be fastened securely to housing via brackets or straps to eliminate excessive flexing or pressure during normal lamp installation. Socket should be replaceable without removing entire housing.
3. Medium BiPin type lamp sockets without a housing shall be secured with (2) appropriate screws or bolts to prevent misalignment.
4. Fluorescent pin type sockets shall utilize corrosion-resistant "edge-wipe" type contacts.
5. Steel metal fluorescent luminaire housing shall be constructed of die formed, heavy duty, cold rolled steel. Housing shall be welded using lab seam construction and corners mitered and free of burrs, cracks, gouges, scratches.
6. Aluminum fluorescent luminaire housing shall be extruded or die formed in sections, which will positively interconnect to provide a rigid unit when assembled.
7. Steel metal construction of fluorescent luminaires housing shall be ribbed, section or paneled to provide internal structure.
8. Parabolic baffle optic control for fluorescent luminaires shall be semi-specular anodized, of low iridescent and constructed of sheet aluminum. Baffle shall be constructed to ensure rigidity and parabolic contours through interlocking cell assembly.
9. Prismatic lenses shall be of virgin acrylic plastic pattern 12 (0.125 inches thick prestressed to span 48-inches) unless specified otherwise on plans.
10. Compact fluorescent luminaire shall incorporate an End of Life (EOL) protection device.

E. HID Luminaires

1. HID luminaries shall be provided with porcelain, screw type mogul sockets UL listed for 1500W or higher at 600 volts where applicable.
2. High pressure sodium luminaries shall operate ballasts and lamps with lamp in open and short circuit conditions for 6 months without significant ballast life loss.
3. High pressure sodium luminaries shall operate within 2% of their labeled wattage with a 10% variance of input rated voltage. Power factor shall maintain minimum of 85% through life.

F. Self-Illuminance Luminaires

1. Self-illuminating luminaries shall have passed ANSI 540 tests of structural integrity by an approved testing agency.
2. Manufacturer of supplied luminaries shall keep record of installation and number of luminaries and type installed.
3. In the event of specified end of code life, the manufacture shall contact and inform the Owner of the expiration date.
4. In the event of demolition, improvements, or permanent removal of luminaire, the manufacture shall be accessible for proper disposal as indicated by OSHA, NFPA, NRC, and other governing authorities at no cost to the owner or future owners.

G. Emergency Lighting Units

1. 90 minute internal battery packs
2. IBC/Life safety approved

H. Acceptable manufacturers shall be as specified on plans per Lighting Fixtures Schedule unless otherwise specified herein or on plans.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Any discrepancies with specified luminaire and its proposed use or environment shall be brought to the Engineer's attention as soon as possible.

1. At project close-out, a list of damaged fixtures received by the contractor shall be provided to the Electrical Engineer for evaluation of fixture manufacturers shipping and packaging methods.

3.2 INSTALLATION

A. Luminaires shall be installed complete with all accessories, glassware, canopies, sockets, reflectors, optics, wiring devices and supplied with new lamps of the type and wattage indicated on plans or in this specification unless specifically noted otherwise.

B. All luminaires shall be supported in accordance with ASTM E-580 recommended guidelines for seismic restraint, as well as the latest version of the International Building Code related to lateral and vertical bracing, including but not limited to:

1. Recessed luminaires shall have a minimum of four (4) #10 gauge wires attached to structure above; (1) wire at each corner of the luminaire. The wires shall be independent of ceiling support system.
2. All lighting fixtures shall be positively attached to the suspended ceiling system. The attachment device shall have a capacity of 100 percent of the lighting fixture weight acting in any direction.
3. Pendant-hung lighting fixtures shall be supported directly from the structure above with #9 gauge wire or approved alternate support without using the ceiling suspension system for direct support.

C. Mount luminaries in mechanical yards, areas and rooms to clear any mechanical equipment, conduit and clearances. Coordinate mounting with mechanical plans.

D. Junction box and ballast compartment shall be accessible from below when housing is installed in final position. Wiring shall be secured from damage when accessed for relamping.

E. Fire rated gypsum board enclosures shall be constructed around all recessed luminaires that penetrate fire rated areas.

F. All surface mounted luminaires installed on a suspended ceiling grid shall have four (4) supporting clips positively attaching corners of housing to the ceiling. Installation shall include 1/8" spacers between the housing and ceiling tile where applicable.

G. Actual locations of luminaires and dimensions shall be referenced to architectural drawings. Electrical plans shall not be used to scale for construction purposes. Any discrepancies shall be brought to the engineer's attention prior to installation.

H. Utilize modular wiring systems in the installation of luminaires where accessible and applicable. The system shall be complete with all required fittings, plugs, and cord drops for a complete operating system per specifications.

I. Provide additional junction boxes as required where conductor exceeds factory provided junction box limitations.

J. Installation shall be appropriately coordinated with all disciplines to insure proper ventilation and heat dissipation as required per manufacturer.

K. Where luminaires are served from two sources, a barrier shall be provided to separate emergency source from normal source with notation indicating separate sources.

L. Luminaires not utilizing modular wiring systems, shall be connected with minimum six (6) foot length of flexible metal conduit from a structurally mounted junction box.

M. Wall mounted luminaries and junction boxes shall be rigidly supported to structure to provide adequate support during normal operation.

N. Pendant luminaries shall be mounted in a uniform mounting height and in straight, parallel, continuous rows. Final coordination with the architectural reflected ceiling plan, mechanical equipment and plumbing fixtures shall be made in the field to ensure consistent spacing and locations.

O. All wall mounted fixtures shall be mounted to a supporting wall bracing material in addition to the junction box. The bracing material is secured to structural elements in the wall. The bracing shall be capable of supporting the weight of the fixture and comply with the manufacturer’s requirements and recommendations.

3.3 LABORATORY INSTALLATION

A. Luminaires mounted in a controlled environment such as a clean room shall be gasketed and sealed where the housing meets the ceiling with a continuous silicone-based resilient sealant bead.

B. Luminaires installed in a wet environment such as a wipe-down or hose-down laboratory shall bear the “Wet Location” UL listing and sealed waterproof with appropriate silicone based resilient sealant.

C. Ceiling openings installed in a sealed environment to insure accessibility to outlet boxes shall be gasketed to prevent any flow of air. The cover shall be constructed to ensure structural integrity for continuous removal from ceiling and be mounted with large head screws as required.

3.4 FIELD TESTING

A. Upon completion of installation, an operation test shall be conducted to show that all equipment operates in accordance with the requirement of this specification.

B. All applicable tests shall be conducted in the presence of an Owner Representative and copies of any reports shall be provided.

C. Reports shall indicate when and where the test was conducted and who was present.

D. Upon completion of installations, luminaires requiring positioning shall be adjusted and aimed at final position.

E. Exit signs shall be individually reviewed after installation completion to ensure directional arrows are properly provided and positioned.

3.5 CLEANING AND REPAIR

A. After complete lighting installation and before project completion, all damaged or faulty lenses or louvers in luminaires shall be replaced by the Electrical Contractor, at no additional cost to the Owner.

B. All anodized or highly visual or optically sensitive reflectors shall be cleaned of all fingerprints and smudges for a clean installation per manufacturers' recommendations.

C. All luminaries with paint scratches, dents or deformations due to installation or shipping shall be repaired, touched up or replaced as required or deemed necessary by the Electrical Engineer at no additional cost to the Owner.

D. Upon final installation of individual luminaires, dirt and debris shall be removed from luminaire enclosures.

END OF SECTION 265100

SECTION 26 56 00

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 SCOPE

A. Provide labor, materials, tools, and equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the equipment of this section, as shown on the drawings and specified herein.

B. Furnish and install complete lighting systems, wired, assembled and operable, except where specifically noted otherwise, which includes but not limited to the following:

1. Luminaires
2. Lamps and ballasts
3. Mounting hardware
4. Accessories as noted
5. Poles
6. Pole bases
7. Anchor bolts and templates
8. Spare lamps

C. The materials and equipment herein specified shall be of new and domestic manufacturer and furnished in accordance with the applicable standards.

D. Specifications and scale drawings are intended to convey the salient features, function and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary of the work.

1.3 QUALITY ASSURANCE AND STANDARDS

A. The latest revision of the standards listed below form an integral part of this specification:

1. American Disabilities Act (ADA)

2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. Institute of Cable Engineers Association (ICEA)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Local Code Enforcement Agency Requirements
7. National Electrical Code (NEC)
8. National Electrical Contractors Association (NECA)
9. National Electrical Manufacturer's Association (NEMA)
10. National Electrical Testing Association (NETA)
11. National Fire Protection Association (NFPA)
12. Underwriters' Laboratories, Inc. (UL)
13. International Building Code (IBC)
14. Illuminating Engineering Society (IESNA)
15. Certified Ballast Manufacturers (CBM)
16. National Appliance Energy Conservation Amendments of 1988 (Public Law 100-357).

Materials and equipment as well as workmanship provided under this section shall conform to the highest commercial standards, and as specified and as indicated on the drawings. Fixture parts and components not specifically identified or indicated shall be made of materials most appropriate to their use or function and as such resistant to corrosion, thermal and mechanical stresses encountered in the normal application and function of the fixtures.

1.4 SUBMITTALS

A. Shop drawings for all fixtures shall be submitted and approved before fabrication. Any material produced prior to the approval of shop drawings or samples, and not in conformance with the Contract Documents, shall be disapproved with the contractor bearing full responsibility and cost. Submit shop drawings per Section 26 05 00 for review, include the following:

1. Luminaires
2. Lamps
3. Ballasts
4. Drivers and Transformers
5. Photometric reports
6. Point-by-point calculations specific to the project.

B. Submit shop drawings indexed, and in accordance with luminaire identification per drawings. Each item shall be tabbed, clearly identifying the catalog ordering numbers including all optional equipment specified.

C. Luminaire shop drawings shall include the following:

1. Manufacturers report of current and original source. Photocopy of partial data sheet or drawings is not acceptable. Report shall include the following:

a. Ballast type, manufacturer and performance characteristics
b. Lamp type, manufacturer and performance characteristics
c. Finish

d. Reflector system and characteristics
e. Diffuser type and characteristics
f. Weight and dimensions
g. EPA rating
h. Standard manufacturer options
i. Luminaire series and model number
j. Luminaire efficiency
k. Candlepower data table
l. Zonal lumens table
m. IES luminaire classification
n. Maintenance and operating instructions including tools required, types of cleaners to be used and suggested replacement parts list.

2. Photometric data assembled in a standard IES photometric test report.

D. Lamp shop drawings shall include type, dimensions, manufacturer and operating characteristics, including but not limited to:

1. Operating voltage range
2. Color Rendering Index (CRI) value per IES standards
3. Color temperature (in Kelvin)
4. Mounting position
5. Starting temperature, indoor and outdoor
6. Starting/restrike time
7. Lamp life
8. Lamp efficiency
9. Warranty
10. Lamp base
11. Lumen rating

E. Ballast shop drawings shall include type, dimensions, manufacturer and operating characteristic including but not limited to:

1. Ballast operating temperature voltage
2. Total harmonic distortion
3. Ballast starting/restrike time
4. Ballast efficiency factor (BEF)
5. Ballast transformation type (i.e.: autotransformer, preheat, instant-start, rapid start, constant wattage, reactor, trigger-start)
6. UL classification (i.e.: Class "P")
7. Power factor
8. Sound rating (fluorescent only)
9. NEMA rating

F. If requested by the Engineer, samples shall be submitted for final selection. Samples shall comply with the following:

1. Paint chips:

a. Samples shall be provided and approved prior to any release to manufacture.

b. Samples shall be minimum of 3"x3" and be of exact finishes.
c. Samples shall be exact representatives of the luminaires:

1) Priming process
2) Painting process
3) Baking process
4) Finish process
5) Luminaire material (i.e. sheet metal, aluminum, wood, etc.)

d. Samples shall be labeled with manufacturers color call-out, as well as the paint manufacturers' call-out.

2. Fixtures:

a. Submit for approval samples called for to the Engineer when and where directed, the components marked with the name of the project, and fixture type, and part number. Fixture shall be provided with a 6' cord and plug, and specified lamp. Allow two weeks from the date of receipt for thorough examination and review by the Engineer.
b. Fixtures under the contract shall be identical with the approved sample fixture. No fixture used as a sample shall be allowed to be installed on the project.
c. In the event the submissions are disapproved, the fixtures shall be returned to the contractor to immediately make a new submission of fixture or fixtures meeting the contract requirements.
d. All charges for these shipments are to be prepaid by the contractor.
e. Samples shall be provided and approved prior to any release to manufacture.

1.5 FACTORY TESTING

A. Luminaire testing shall be conducted by an approved independent testing laboratory.

B. Luminaire tests shall be reported in accordance with Illuminating Engineering Society (IES) Standard Photometric Test Report.

1.6 WARRANTY

A. Contractor shall warranty equipment and installation free from defects in material and workmanship for a period of no less than (1) year from the date of project completion. This includes the fixture, its finishes and components (see ballasts below).

B. Fluorescent ballasts shall be warranted against defects in material and workmanship for a period of no less than (5) years for electronic ballasts, from the date of project completion regardless of the date of manufacture.

C. HID ballasts shall be warranted against defects in material and workmanship for a period of no less than (2) years from the date of project completion regardless of the date of manufacture.

D. LED modules and drivers shall each be warrantied against defects in material and workmanship for a period of no less than five (5) years, from the date of project completion regardless of the date of manufacture.

PART 2 - PRODUCTS

2.1 GENERAL

A. Luminaires shall bear the appropriate UL label for location, mounting position and operating conditions in which it is installed.

B. Luminaires, ballasts and lamps shall each be of the same manufacturer and of identical finish, appearance, and performance. Luminaires which are pre-lamped before shipment shall have identical lamp manufacturer. Mix and match of different lamp manufacturer shall not be acceptable.

C. Recessed ceiling mounted luminaires shall be provided with appropriate frame and trim type compatible with ceiling construction. Reference architectural plans for ceiling construction type and specifications.

D. Luminaires and devices shall be free of burrs, scratches, marks, and dents which may occur during transportation, storage or installation. Construction shall be finished to eliminate sharp edges exposed to installer and end-user.

E. Sheet metal construction of luminaires shall be of sufficient rigidity to prevent deformation during installation and typical use.

F. Cast parts and sections of a luminaire shall be smooth, free of blemishes, rust and scale and be irradiated, sandblasted and anodized.

G. All burned out lamps and ballasts shall be replaced by the end of contract prior to Architect, Owner Representative and Engineer final punchlist.

H. Color shall be as indicated on plans.

I. Enamel paint shall be baked on at a minimum 300 degrees F and have 86% reflectivity for a surface, which is to be reflective.

J. Housings: Rigidly formed, weather and light tight enclosures that will not warp, sag, or deform in use.

K. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.

L. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.

M. Lenses and Refractors: Materials as indicated. Use heat and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.

N. All exterior light fixtures should have polycarbonate or otherwise break/vandal resistant lenses.

2.2 LAMPS

A. Incandescent lamps

1. Incandescent lamps below 300W shall be medium base type unless otherwise noted.
2. Incandescent lamps shall be frosted inside or as manufacturer recommended and 130V rated unless otherwise noted.
3. Low Voltage lamps MR16 shall be “NFL” unless otherwise noted.

B. LED (Lighting Emitting Diode) Modules

1. Unless specified on plans or in Lighting Fixture Schedule, the module color temperature shall be 4000 Kelvin (K).
2. Unless otherwise noted, modules shall have a CRI (color rendering index) of 80 or greater.
3. Return lumen output shall be based on fixture absolute lumens as defined in LM-79 (IESNA).
4. Modules shall comply with LM-80 (IESNA).
5. LED modules shall be interchangeable without removal or replacement of heat sink or luminaire.
6. Luminaire Manufacturer to offer replacement modules that maintain rated lumen package per initial design luminaire.
7. Minimum rated life of modules shall be 50,000 hours per IESNA L70.

C. Acceptable Manufacturers

1. LED Chips: Cree, Nichia, Philips or approved equal.

D. Fluorescent lamps

1. Unless specified on plans or in Lighting Fixture Schedule, the lamp color temperature shall be 3500 Kelvin (K).
2. Unless otherwise noted, lamps shall have a CRI (color rendering index) of 82 or greater.

E. HID lamps

1. Metal halide lamps shall be phosphor coated and universal burning position type unless otherwise noted. Metal halide lamps shall incorporate a quartz shroud around arc tube to prevent outer jacket rupture in the event of a non-passive arc tube failure.
2. Metal halide lamps shall be of the type with a lifetime color stability within +/- 200K. If not available for the type and wattage specified, metal halide lamps with the best color

uniformity as per current industry standards shall be used.

3. High Pressure Sodium lamps shall be diffuse coated and universal burning position type unless otherwise noted.

F. Compact Fluorescent

1. Unless specified on plans or in Lighting Fixture Schedule, the lamp color temperature shall be 3500 Kelvin (K).
2. Unless otherwise noted, lamps shall have a CRI (color rendering index) of 82 or greater.
3. Lamp base and fixture socket shall match pin configuration.

G. Acceptable manufacturers

1. Incandescent Lamps: Osram/Sylvania, GE or Philips
2. Fluorescent Lamps: Osram/Sylvania, 800 XP series
3. Low Pressure Sodium Lamps: Osram/Sylvania or Philips
4. Metal Halide Lamps: Osram/Sylvania, GE or Philips
5. High Pressure Sodium Lamps: Osram/Sylvania, GE or Philips

H. All lamps shall be burned once installed in the fixtures for 100 hours, prior to switching.

2.3 BALLASTS

A. General

1. Ballasts shall be UL listed when installed in luminaire.
2. Ballasts shall be grounded appropriately as governed by NEC Article 410-E.
3. Ballasts shall be located within the luminaire for which it is operating unless specifically indicated on plans as remote ballast type.
4. Ballasts shall contain no PCB's in any indoor or outdoor installation unless otherwise noted.
5. Ballasts shall be rated weatherproof type where there is moisture present.
6. A permanent waterproof seal shall be factory provided where the wiring enters the ballast compartment of an outdoor luminaire installation.

B. LED Drivers

1. Shall be UL listed when installed in luminaire.
2. Drivers shall be grounded appropriately as governed by NEC Article 410-E.
3. Drivers shall be located within the luminaire for which it is operating unless specifically indicated on plans as remove ballast type.
4. Remote drivers shall be located in accessible location, within manufacturers maximum distance requirements.
5. Drivers shall be rated weatherproof type where there is moisture present.
6. A permanent weatherproof seal shall be factory provided where the wiring enters the ballast compartment of an outdoor luminaire installation.
7. Drivers shall have a standard dimming protocol of 0-10V unless otherwise noted on the Luminaire Schedule.

8. Shall operate with no detectable flicker and be high power factor (95% or higher).

9. Drivers shall be marked with the manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each LED module being powered and bear all applicable UL listing on housing.
10. All drivers shall be compatible with dimming protocol of connected room controllers, panels, local controls, devices and other luminaires.

C. Acceptable Manufacturers

1. Osram/Sylvania, GE, Philips or EldoLED.

D. Electromagnetic Ballasts

1. Electromagnetic "standard" ballast shall comply with the "National Appliance Conservation Amendment of 1988" (Public Law 100-357) Ballast Efficiency Factor (BEF) as enforced by the Certified Ballast Manufactures (CBM) for "high efficiency" ballast design standards.
2. Electromagnetic ballasts shall be sound "A" rated per NEMA standards.
3. Electromagnetic ballasts shall comply with NEC standards for thermal protection and shall be UL listed and marked "Class P".
4. Electromagnetic ballasts shall be listed by California Energy Commission's Energy Efficiency Standards of approved ballast manufacturers.
5. Electromagnetic ballasts indicated to be high power factor (HPF) shall be rated 90% (P.F.) minimum unless otherwise noted.

E. Solid State Ballasts (Electronic)

1. Electronic ballasts shall meet or exceed ANSI, IEEE, and FCC standards for lamp starting and operation, electro-magnetic interference, radio frequency interference suppression and line transient protection.
2. Electronic ballasts shall not interfere with other electrical equipment normal operation.
3. Electronic ballasts shall operate at a frequency of 20 to 35 kHz with no detectable flicker and be high power factor (97% or higher).
4. Electronic ballasts that operate more than one lamp shall be able to maintain full output of the companion lamp(s) after failure of any combination of lamp(s).
5. Electronic ballasts shall not be affected by lamp failure nor hinder the normal life of operating lamp.
6. Electronic ballast normal case operating temperature shall not exceed 70 degree C.
7. Rapid-start electronic ballasts shall provide soft/stable start of rapid-start lamps and maintain full cathode heat during operation.
8. Electronic ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type and bear all applicable UL listings on housing.

F. Low-Pressure Sodium Ballasts

1. Low-pressure sodium ballasts shall bear all applicable UL listings on housing.
2. Low-pressure sodium ballasts shall be auto-leakage transformer type.

G. HID Ballasts

1. Metal halide ballasts shall be Lead-Peak Autotransformer type with current crest factor of 1.6 to 1.8 and voltage regulation of 10% allowable.
2. High pressure sodium ballasts shall be Regulating type with voltage regulation of 10% allowable and shall meet ANSI trapezoid limitations for voltage characteristics over the life of the lamp.
3. HID ballasts shall be fused with manufacturer recommended size and type.
4. HID ballasts shall bear all applicable UL listings on housing.

H. Acceptable Manufacturers

1. Solid state ballasts (electronic): Osram Sylvania or “Quicktronic”.
2. Low-pressure sodium ballasts: Magnetek, Advance Transformer Co. or approved equal.
3. Metal halide ballasts: Magnetek, Advance Transformer Co. or approved equal.
4. High-pressure sodium ballasts: Magnetek, Advance Transformer Co. or approved equal.

2.4 LUMINAIRES

A. General

1. Escutcheon plates, coverplates, and finish trim hardware shall meet flush with ceiling, floor, wall or other surfaces to which they may be mounted.
2. Luminaire construction shall allow initial installation of recessed luminaires without the presence of finish trim, diffusers or lens.
3. Lamp sockets and reflector assemblies shall be securely fastened to luminaire housing to prevent rotation, adjustment or rocking of hardware during lamping or future relamping.
4. Luminaire lenses shall be securely retained in a fashion so that relamping or accessing to luminaire will not dislodge lens.
5. Luminaires lenses and diffusers shall be free from chromatic or spherical imperfections and have thermal characteristics capable of withstanding installed lamp temperatures.
6. Pendant type luminaires shall be mounted to provide balanced construction with the use of swivel hanger. Swivel hanger shall be provided standard or ordered as accessory unless specified otherwise.
7. Bracket type luminaires shall be specifically designed for type installation which is indicated.
8. Luminaires shall be factory tested, prewired and preassembled unless otherwise specified or intended.
9. Luminaires located in direct exposure to the weather to include rain, sleet and snow shall be marked "Suitable For Wet Locations" with UL label. Luminaires located outdoors but not in direct exposure to rain shall be market "Suitable for Damp Locations" minimum rated.
10. Where ceiling space is not accessible, luminaire housing shall provide access to luminaire junction box to comply with NEC section 370-29.
11. Luminaires shall contain an integral ballast disconnect compliant with NEC section 410.73.

B. Incandescent Luminaires

1. Recessed incandescent luminaires shall be provided with mounting frame and attached prewired junction box rated for through-wiring with 60 degree C conductors.

C. LED Luminaires

1. Luminaires shall come with manufacturer provided LED module installed.
2. All luminaires shall meet building energy code Title 24-2013 efficacy requirements.
3. Luminaire housing, driver and module shall be products of the same manufacturer.
4. IES files shall include BIG ratings of fixture for each distribution and configuration.

D. Fluorescent Luminaires

1. Recessed fluorescent luminaires shall be constructed to limit ballast housing surface temperature in luminaire to 90 degrees C with the following factors:

    a. Voltage: 277V +5%
    b. Room Ambient Temp: 25 degrees C + 5%
    c. Plenum Ambient Temp: 55 degrees C +5%
    d. Ceiling Material R Factor: 20

2. Medium BiPin type lamp socket shall be fastened securely to housing via brackets or straps to eliminate excessive flexing or pressure during normal lamp installation. Socket should be replaceable without removing entire housing.
3. Medium BiPin type lamp sockets without a housing shall be secured with (2) appropriate screws or bolts to prevent misalignment.
4. Fluorescent pin type sockets shall utilize corrosion-resistant "edge-wipe" type contacts.
5. Steel metal fluorescent luminaire housing shall be constructed of die formed, heavy duty, cold rolled steel. Housing shall be welded using lab seam construction and corners mitered and free of burrs, cracks, gouges, scratches.
6. Aluminum fluorescent luminaire housing shall be extruded or die formed in sections, which will positively interconnect to provide a rigid unit when assembled.
7. Steel metal construction of fluorescent luminaires housing shall be ribbed, section or paneled to provide internal structure.
8. Parabolic baffle optic control for fluorescent luminaires shall be semi-specular anodized, of low iridescent and constructed of sheet aluminum. Baffle shall be constructed to ensure rigidity and parabolic contours through interlocking cell assembly.
9. Prismatic lenses shall be of virgin acrylic plastic pattern 12 (0.125 inches thick prestressed to span 48-inches) unless specified otherwise on plans.
10. Fluorescent luminaires mounted in accessible ceiling areas shall utilize a plug together modular wiring system. The system shall be installed with all required fittings, plugs, and cord drops for a complete and operating system.
11. Compact fluorescent luminaire shall incorporate an End of Life (EOL) protection device.

E. Low Pressure Sodium Luminaires

1. Low pressure sodium luminaires shall comply with HID luminaire requirements where

applicable.

F. HID Luminaires

1. HID luminaires shall be provided with porcelain, screw type mogul sockets UL listed for 1500W or higher at 600 volts where applicable.
2. High-pressure sodium luminaires shall operate ballasts and lamps with lamp in open and short circuit conditions for 6 months without significant ballast life loss.
3. High-pressure sodium luminaires shall operate within 2% of their labeled wattage with a +/-10% variance of input rated voltage. Power factor shall maintain minimum of 85% through life.

2.5 LUMINAIRE SUPPORT COMPONENTS

A. Description: Comply with AASHTO LTS-3 for pole or other support structures, brackets, arms, accessories, base, and anchorage and foundation.

B. Wind-Load Strength of Total Support Assembly: Adequate to carry support assembly plus luminaires at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of 110 mph with a gust factor of 1.3. Support assembly includes pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.

C. Finish: Match finish of pole/support structure for arm, bracket, and tenon mount materials.

D. Mountings, Fasteners, and Accessories: Corrosion-resistant items compatible with support components.

1. Materials: Will not cause galvanic action at contract points.
2. Mountings: Correctly position luminaire to provide indicated light distribution.
3. Anchor Bolts, Nuts, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated.
4. Anchor-Bolt Template: Plywood or steel.

2.6 LUMINAIRE TYPES

A. See Fixture Schedule on electrical drawing.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Any discrepancies with specified luminaire and its proposed use or environment shall be brought to the Engineer's attention as soon as possible.

1. At project close-out, a list of damaged fixtures received by the contractor shall be provided to the Electrical Engineer for evaluation of fixture manufacturers shipping and packaging methods.

3.2 INSTALLATION

A. Luminaires shall be installed complete with all accessories, glassware, canopies, sockets, reflectors, optics, wiring devices and supplied with new lamps of the type and wattage indicated on plans or in this specification unless specifically noted otherwise.

B. Concrete Foundations: Construct according to details and drawings.

1. Comply with details for reinforcement and for anchor bolts, nuts, and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.

C. Install poles as follows:

1. Use web fabric slings (not chain or cable) to raise and set poles.
2. Mount pole to foundation with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
3. Secure poles level, plum, and square.
4. Grout void between pole base and foundation. Use nonshrinking or expanding concrete grout firmly packed in entire void space.

D. All luminaires (where applicable) shall be supported in accordance with ASTM E-580 recommended guidelines for seismic restraint, as well as the latest version of the Uniform Building Code related to lateral and vertical bracing, including but not limited to:

1. Recessed luminaires shall have a minimum of two (2) #12 gauge wires attached to structure above, independent of ceiling support system.
2. All lighting fixtures shall be positively attached to the suspended ceiling system. The attachment device shall have a capacity of 100 percent of the lighting fixture weight acting in any direction.
3. Pendant-hung lighting fixtures shall be supported directly from the structure above with #9 gauge wire or approved alternate support without using the ceiling suspension system for direct support.

E. Mount luminaires in mechanical yards, areas and rooms to clear any mechanical equipment, conduit and clearances. Coordinate mounting with mechanical plans.

F. Junction box and ballast compartment shall be accessible from below when housing is installed in final position. Wiring shall be secured from damage when accessed for relamping.

G. Fire rated gypsum board enclosures shall be constructed around all recessed luminaires that penetrate fire rated areas.

H. Actual locations of luminaires and dimensions shall be referenced to architectural drawings. Electrical plans shall not be used to scale for construction purposes. Any discrepancies shall be brought to the engineer's attention prior to installation.

I. Provide additional junction boxes as required where conductor exceeds factory provided junction box limitations.

J. Installation shall be appropriately coordinated with all disciplines to insure proper ventilation and heat dissipation as required per manufacturer.

K. Where luminaires are served from two sources, a barrier shall be provided to separate emergency source from normal source with notation indicating separate sources.

L. All wall mounted fixtures shall be mounted to a supporting wall bracing material in addition to the junction box. The bracing shall be installed behind the finished wall surface and be secured to structural elements in the wall. The bracing shall be capable of supporting the weight of the fixture and comply with manufacturer's requirements and recommendations.

M. Pendant luminaires shall be mounted in a uniform mounting height and in straight continuous rows. Final coordination with mechanical equipment and plumbing fixtures shall be made in the field to ensure consistent spacing and locations.

N. Luminaire Attachment: Fasten to indicated structural supports.

O. Luminaire Attachment with Adjustable Features or Aiming: Attach luminaires and supports to allow aiming for indicated light distribution.

P. Lamp luminaires with indicated lamps according to manufacturer's written instructions. Replace malfunctioning lamps.

Q. All exterior wall mounted fixtures shall be sealed watertight between the fixture housing or the canopy and the wall (or structure). Clear silicone caulking (or matching color), shall be used.

R. All exterior building lighting will have separate circuits from exterior pole lighting.

3.3 CONNECTIONS

A. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.
2. Ground metal poles/support structures according to Division 26 Section "Grounding and Bonding."

3.4 DELIVERY, STORAGE, AND HANDLING OF POLES

A. Package aluminum poles for shipping according to ASTM B 660.

B. Store poles on decay-resistant treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

C. Retain factory-applied pole wrappings on fiberglass poles until just before pole installation. Handle poles with web fabric straps.

D. Retain factory-applied pole wrappings on metal poles until just before pole installation. For

poles with nonmetallic finishes, handle with web fabric straps.

3.5 FIELD TESTING

A. Upon completion of installation, an operation test shall be conducted to show that all equipment operates in accordance with the requirement of this specification.

B. All applicable tests shall be conducted in the presence of an Owner Representative and copies of any reports shall be provided.

C. Reports shall indicate when and where the test was conducted and who was present.

D. Upon completion of installations, luminaires requiring positioning shall be adjusted and aimed at final position.

3.6 CLEANING AND REPAIR

A. After complete lighting installation and before project completion, all damaged or faulty lenses or louvers in luminaires shall be replaced by the Electrical Contractor, at no additional cost to the Owner.

B. All anodized or highly visual or optically sensitive reflectors shall be cleaned of all fingerprints and smudges for a clean installation per manufacturers' recommendations.

C. All luminaires with paint scratches, dents or deformations due to installation or shipping shall be repaired, touched up or replaced as required or deemed necessary by the Electrical Engineer at no additional cost to the Owner.

D. Upon final installation of individual luminaires, dirt and debris shall be removed from luminaire enclosures.

END OF SECTION 265600

SECTION 27 01 06

COMMUNICATION SYSTEMS FIRESTOPPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Select, furnish and install U.L. approved firestopping materials and systems as indicated on the Drawings, Specified or as otherwise required, to the approval of the Local Authority Having Jurisdiction.

1.2 SUBMITTALS

A. Contractor Submittals
   1. The Contractor shall submit to the Owner and Engineer a minimum of ten (10) days prior to installation for review and acceptance cut-sheets for fire-stopping materials and assemblies, which have been reviewed and approved by the Local Authority Having Jurisdiction (AHJ).
   2. The Contractor shall submit to the Owner and Engineer a minimum of ten (10) days prior to installation for review and acceptance the Fire Stop applicators certifications.
   3. All firestopping adhesives to contain VOC levels of 0g/L or 0%. If materials used exceed this limit, submit cutsheets to the Owner confirming VOC levels are within project limits.

PART 2 - PRODUCTS

2.1 MATERIALS AND SYSTEMS

A. The Contractor shall provide through penetration firestops as per ASTM E-814 and Ul-1479. Firestop systems shall have been tested by UL and meet the rating criteria, as published in the UL Fire Resistance Directory. The Contractor is referenced to the latest BICSI Telecommunications Distribution Methods Manual (TDMM) and EAI/TAI-569A Annex “A” for general guidelines and overview of firestop technology and methods. Contractor shall consult individual manufacturer’s instructions for specific application details.

B. Openings around cable trays, cable channels, conduits or in sleeves penetrating fire-rated floor slabs, walls, partitions, ceilings or smoke partitions, shall be sealed at both sides of the partition. Pack openings with calcium silicate blocks, 3M Brand Fire Barrier Caulk “CP25” and Putty “303”, 3M Brand Series 7902/7904 systems for floor and walls, Nelson Flame Seal System, or an Owner and Engineer accepted material having the same fire-rating as the floor or wall penetrated. Fiberglass is not acceptable.

C. All firestopping systems shall be of a single manufacturer, as manufactured by 3M, Nelson, Specified Technologies, Hilti or Owner and Engineer approved equal. Contractor shall submit cut sheet to the “Authority Having Jurisdiction” (AHJ) for approval prior to submittal to the Owner and Engineer for review and acceptance.

D. The Contractor shall refer to Division 07 of the Architectural Specifications for requirements for Firestopping, Smoke Seals and Smoke Containment Barriers.

E. The Contractor shall be responsible for meeting and complying with all applicable criteria and standards of the above sections and others as applicable.

PART 3 - EXECUTION

3.1 RESPONSIBILITY FOR WORK OF THIS SECTION

A. Contractor shall refer to the Life Safety Report on the Architectural Drawings for the extent and location of fire barriers and ratings.

B. The Contractor shall verify with the Architect or the Local Building Authority, the fire rating requirements of any wall or floor to be breached by a conduit, cable, raceway or other penetration as per ASTM E-119 (NFPA-251 and UL-263) standards. The Contractor shall notify the Owner, Engineer, and Architect in writing of all existing non-compliant conditions for resolution.

C. The presence of existing non-compliant conditions will not exempt the Contractor from meeting the installation fire rating requirements for new construction.

D. If Contract Documents indicate, or Contractor directs, that firestopping work is to be provided by more than one Subcontractor, each Subcontractor shall provide firestopping as specified in the Section.

E. All penetrations into MDFs, BDFs, and TRs must be fire stopped even if not required by code.

3.2 REGULATORY REQUIREMENTS

A. Fire rated assembly: Comply with construction of fire rated assemblies as acceptable to local Authority Having Jurisdiction (AHJ) agency. Materials, installation procedures and other requirements of specific assembly supersede any conflicting requirements specified herein.

3.3 QUALITY ASSURANCE

A. Firestopping materials shall conform to both Flame (F) and Temperature (T) ratings as tested by nationally accepted test agencies per ASTM E-814, UL 1479 or UL 2079 fire tests.

B. The F rating shall be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated.

C. Conduct the fire test with a minimum positive pressure differential of 0.01 inches of water column.

D. Comparable tests by other approved testing agencies shall also be acceptable.

E. Installer shall have a copy of above-referenced fire tests available at field office.

F. Materials shall meet and be acceptable for use by the Local Building Code.

G. Materials shall meet the requirements of NFPA 101 – Life Safety Code and NFPA 70 – National Electrical Code.

H. Applicator qualifications: Trained by manufacturer or manufacturer's approved representative, in installation of UL or other approved testing agency classified firestopping assemblies. Installer to be certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer qualification on the buyer.

I. It is highly recommended by the Owner and Engineer, for liability purposes, that the Contractor avail himself of the services of a "Specialty Contractor" who is trained, experienced and certified as qualified to properly select, install and warranty his work.

J. The Contractor shall submit the applicators certifications, shop drawings and cut sheets for materials and system to the Owner and Engineer prior to installation. Contractor to allow a minimum of ten (10) working days for review prior to installation.

K. Equipment used shall be in accordance with firestop manufacturer's written installation instructions.

L. Sample Mock-Up: Prepare job mock-up of the material proposed for use in the location as directed by the Architect. Approved mock-ups shall be left in place as part of the finished project and shall be used as the standard for remaining work.

M. Pre-Installation conference: Prior to commencement of work of this section, coordinate with Construction Manager to schedule a meeting on site with Construction Manager, Firestopping Contractor, a representative of firestopping product manufacturer, Owner, Engineer, and Architect to review specifications, scope of work, and other requirements, to ensure complete compliance with specifications and understanding of job conditions.

3.4 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section as required with work performed by other trades on the project.

B. Firestopping of cable trays and cable pass-thrus shall be completed after all cables have been installed.

3.5 INSPECTION

A. Prior to installation, inspect and verify that surfaces and substrates have no defects or errors that would interfere with installation of the firestopping materials.

B. Notify the Owner, Engineer, and Architect of conditions which would prevent proper installation.

C. Do not proceed until unsatisfactory conditions have been corrected or adjusted.

D. Start of installation constitutes acceptance of surfaces and conditions of substrates.

3.6 COORDINATION

A. Coordinate:

1. Installations with manufacturers to ensure compliance with their tested assemblies, or approved extrapolations thereof.
2. With mechanical and electrical trades to ensure full knowledge of types and uses of pipes, ducts, conduits and similar, and with all other trades, for compliance with tested assemblies, or approved extrapolations thereof.
3. With mechanical and electrical trades to ensure that annular spaces are kept to the minimum size necessary for passage of work of their trades and installation of firestopping specified herein.
4. With other trades to ensure installation of firestopping after completion of penetrating item but prior to covering or concealing openings.

3.7 PREPARATION

A. Clean surfaces and substrates of dirt, oil, loose materials and other foreign materials which may affect the proper bond or installation of the firestops; follow manufacturer’s written instructions.

B. Unless approved by manufacturer, do not apply firestopping material to surfaces previously painted or treated with a sealer, curing compound, water repellent or other incompatible material; remove coatings as required in compliance with manufacturer’s instructions.

C. Mask where necessary to protect adjoining surfaces.

D. Provide required ventilation.

3.8 INSTALLATION OF MATERIALS IN FIRE-RATED WALLS

A. Install in strict accordance with manufacturer's printed instructions and UL or other approved testing agency regulations.

B. Do not install systems which are not in strict conformance with UL or other approved testing agency regulations unless system needed cannot meet UL or other approved testing agency regulations, and unless approve in writing by manufacturer as being equivalent to UL or other approved testing agency test.

C. Install to provide Flame (F) and Temperature (T) rating of minimum one (1) hour, but not less than the fire resistance rating of the assembly in which the firestopping materials are being installed. At curtain wall system at building perimeter and in spaces wider than 2 inches fill with mineral fiber with foil-faced side up and seal both edges with smokestop sealant. Anchor mineral fiber with manufacturer's standard impaling clips.

D. Install anchoring devices, back-up materials, clips, sleeves, supports and other materials as used and approved in the ASTM E-814 and UL 1479 or other approved testing agency fire tests, and as approved by manufacturer.

E. Install firestops with sufficient pressure to fill and seal holes, voids and openings to ensure an effective smoke seal. When installing mineral fiber insulation at perimeters of fire rated partitions, also install firestopping sealant to ensure total prevention of smoke passage.

F. Tool or trowel exposed surfaces. Remove excess firestop material promptly as work progresses and upon completion.

G. Apply primer over sealant on surfaces to be finish painted under Division 09.

3.9 INSTALLATION OF SEALANT IN ACOUSTICALLY RATED WALLS

A. Install in strict accordance with manufacturer's printed instructions.

B. Tool or trowel exposed surfaces. Remove excess sealant promptly as work progresses and upon completion. Ensure full contact with surfaces being sealed.

C. Apply primer over sealant on surfaces to be finish painted under Division 09.

3.10 FIELD QUALITY CONTROL

A. Post-installation inspection: Immediately upon completion of work of this section, coordinate with Owner, Engineer, and Architect and firestopping installing company to schedule a meeting at site with Owner, Engineer, and Architect, firestopping installing company to review entire installation to ensure complete compliance with specifications and requirements for rated installations.

3.11 CLEANING AND ADJUSTING

A. Examine work installed herein to ensure proper installation and full compliance with this specification prior to concealing or enclosing work.

B. Work in fire-rated assemblies shall be accessible until inspection and approval by authorities from the code-enforcing authorities upon their request.

C. Correct unacceptable work and provide additional inspection to verify compliance with this specification at no additional cost to Owner.

D. Where finished work will be visible, clean adjacent surfaces in accordance with manufacturer's printed instructions.

END OF SECTION

SECTION 27 05 26

GROUNDING AND BONDING FOR COMM SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and install a telecommunications grounding system, complete as per TIA/EIA-607A standards, compliant with NFPA-70 (N.E.C.) Articles 250, 800, etc. as indicated on the Drawings, specified or as otherwise required.

B. The Contractor shall furnish and install all materials and equipment to make a complete working system as indicated on associated communication drawings and these specifications.

C. This specification shall include all labor, materials, equipment and services necessary for all Communications Grounding and Bonding work. Work shall include, but not be limited to the following:

1. Telecommunications Grounding Bus Bars
2. Bonding Backbone Conductor and Bonding Conductors
3. Grounding Clamps and Bushings
4. Ground Rods and Electrodes
5. Ground Lugs and Hardware
6. Exothermal Welds

PART 2 - PRODUCTS

2.1 MATERIALS

A. The telecommunications grounding system shall be as indicated on the Engineering Drawings.

B. Components and materials shall comply with applicable requirements of U.L. Standards No.'s 467 and 869, IEEE Standard 1100-1992, latest editions of the TIA/EIA-607A standards and the BICSI Telecommunications Distribution Methods Manual (TDMM) for the installation of telecommunications grounding and bonding systems.

C. Except as otherwise indicated, provide telecommunications grounding system materials as indicated, including but not limited to cable, conductors, connectors, terminals, compression lugs, grounding rod electrodes, grounding plate electrodes, bonding jumper braid, surge arresters, etc. Components shall be U.L. Listed for the purpose intended.

D. Telecommunication Main Grounding Bus Bar (TMGBB)

1. Locate in the MDF room.
2. "20 x 4" x 1/4" copper bus bar mounted on 4" high insulator standoffs; Newton Instrument P/N 221311 or Owner and Engineer approved equal by CPI, Homaco, Panduit or Harger.

E. Telecommunication Grounding Bus Bar (TGBB)

1. Locate in each active and inactive TR
2. 12" x 4" x 1/4" copper bus bar mounted on 4" high insulator standoffs; Newton Instrument P/N 221309 or Owner and Engineer approved equal by CPI, Homaco, Panduit or Harger.

F. Telecommunication Bonding Backbone (TBB)

1. The TBB shall be at minimum equal to the electrical service entrance grounding conductor in size, or a minimum of a #2 AWG copper conductor (whichever is larger), unless noted otherwise.

2. The only allowable exception to an insulated copper conductor for the TBB, shall be where the TBB is routed exposed in a plenum rated space, in which case the bare copper conductor shall be routed in a plenum rated inner duct or other Engineer approved method.
3. Bonding conductors shall be a minimum #6 AWG insulated stranded copper.

G. Distribution Rack Ground Bar

1. 21-1/4" x 3/4" x 3/16" copper bus bar; Ortronics OR-808004551, Newton Instruments P/N 221618, Homaco #GB-19, CPI 10610-019, Saunders #SB-579-03 or Owner and Engineer approved equal.
2. Bonding and Ground Conductors No. 6 AWG and Larger
3. Insulated conductor shall be Type XHHW copper, 600 Volt, unless otherwise noted, insulated with virgin cross-linked polyethylene insulation. Approved manufacturers are Aetna, American Insulated, Encore, Superior Essex, Paranite, Pirelli, Rome and South Wire.
4. Bare conductor shall be as manufactured by Aetna, American Insulated, Encore, Superior Essex, Paranite, Pirelli, Rome and South Wire.
5. Grounding Clamps and Bushings
6. Grounding clamps shall be UL Listed, with irreversible compression lug with nut, bolt and lock washer connection as manufactured by Thomas & Betts, Burndy, Harger or approved equal.
7. Setscrew type terminations are not acceptable.
8. Nut, bolt and lock washer hardware shall be Type 304 stainless steel.
9. Conduit bushings shall be insulated grounding type, UL Listed, with irreversible compression lug with nut, bolt and lock washer connection as manufactured by Thomas & Betts, Burndy, O-Z Gedney or approved equal.
10. Setscrew type terminations are not acceptable.
11. Nut, bolt and lock washer hardware shall be Type 304 stainless steel.

H. Ground Rods and Electrodes

1. Install ground rod adjacent to the TMGBB in the MDF.
2. Ground rods shall be 3/4" diameter x 10 foot copper clad steel as manufactured by Erico, Harger or approved equal.

I. Ground Electrodes and Accessories

1. Copper ground plates shall be 24" x 24" x 1/4" copper alloy with exothermic conductor connection as manufactured by Erico, Harger or approved equal.
2. Grounding mesh mat shall be a 4' x 6' hot dipped galvanized mat made from 6" x 6" welded mesh of 1/4" diameter steel wire, with a silicone bronze connector, bolt, nut and lock washer as manufactured by T&B Blackburn or approved equal.
3. Enhanced ground rods shall consist of a hollow perforated copper tube with exothermically welded pigtail conductor as manufactured by Harger, Erico or approved equal.
4. The pigtail shall be attached in an upward direction, maintaining the downward fault/surge current flow.
5. The enhanced ground rod shall be installed utilizing an approved ground enhancement material and electrolytic charging salts.
6. The enhanced ground rod shall be UL 467 9.2.7/8/9 Listed
7. Ground enhancement material shall be of a low resistance carbon based material as manufactured by Harger, Erico or approved equal.
8. Electrolytic charging salts shall be of a mixture of 60% Sodium Chloride and 40% Calcium Chloride salts that does not accelerate corrosion of the metallic electrode.
9. Ground access wells shall be of HDPE Schedule 40 PVC with solid cover.
10. Flat steel covers shall be 3/16" thick hot dipped galvanized or heavy duty zing coated.

11. Ground access wells shall not be placed in a full traffic H-20 area.
12. To prevent displacement by freezing, the access well must extend below the freeze line.

J. Grounding Lugs and Hardware

1. Ground lugs shall be 2-hole, electroplated tinned copper, irreversible compression type, sized for the conductor and hole size and pattern, as manufactured by Harger, Panduit, Burndy, T&B, Erico or approved equal.
2. C-Taps shall be electroplated tinned copper or aluminum, irreversible compression type as manufactured by Erico, Panduit, Harger, T&B, Burndy or approved equal.
3. Hardware (nuts, bolts, lock washers) shall be either Type 304 stainless steel.
4. Lock washer shall be of the "Star Washer" type unless otherwise noted.
5. Oxide inhibiting joint compound shall be utilized on all mechanical grounding and bonding joints and connections.
6. Synthetic base compound with suspended zinc particles for aluminum to aluminum and aluminum to copper connections.
7. Synthetic base compound with suspended copper particles for copper to copper connections.
8. Oxide inhibiting joint compound shall be as manufactured by Harger, NO-OX-ID, Penetrox/Burndy, Panduit, Erico or approved equal.
9. Exothermic Welding Equipment and Materials
10. Exothermic welds are produced from the energy and molten copper alloy metal released from an exothermic reaction between powered copper oxide and aluminum. Molten copper alloy is created to melt the conductors and cast a continuous fusion weld of high mechanical and electrical integrity.
11. Shall be U.L. Listed.
12. Exothermic welds shall be as manufactured by Erico Cad Weld, Harger, Furse Weld/T&B or Owner and Engineer approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding specifications for the data/telecommunication grounding system are issued in conjunction with and in addition to Grounding and Bonding Specification, Section 26 05 26.

B. Grounding specifications for the Communication Grounding System are issued in conjunction with and in addition to Grounding and Bonding Specification, Section 26 05 26. The Contractor shall furnish and install a Communication Grounding System, providing a low impedance path to ground and a stable +0 volt to ground signal reference point for the communication systems equipment and infrastructures.

C. The communication grounding system shall comply with the TIA/EIA-607A "Standard for Commercial Building Grounding and Bonding Requirements for Telecommunications" and the IEEE Standard 1100 "Recommended Practice for Powering and Grounding Sensitive Electronic Equipment". The Communication Ground System shall be as indicated on the detailed engineering drawings and this specification.

D. The communication grounding and bonding system infrastructure shall originate with a low resistance connection to the electrical service entrance equipment (MDP) ground bus, as per the NEC 250.94 and extend as an independent ground system throughout the building.

E. The connection to the electrical service entrance ground bus (bonding conductor for telecommunications) shall be equal in size to the electrical service entrance ground conductor or a maximum #4/0 AWG copper conductor to the Telecommunication Main Grounding Bus bar (TMGB), located in the telecommunication entrance facility or data/telecommunications equipment room, adjacent to the data/telecommunication service entrance equipment as required.

F. The Communication Grounding System shall meet NEC Article 250 & 800 requirements. Contractor shall bond individual electronic components and equipment to the grounding system as per the equipment manufacturer's recommendations and instructions.

G. The contractor will complete the installation of all grounding components to a given area including: all racks, cable trays, cabinets, lightening protectors, etc. prior to the pulling of any cable (horizontal or backbone) in that area. The contractor will contact the Engineer and the Owner to complete a visual inspection of the installed grounding components to obtain authorization to begin the installation of communication cable.

H. The installation of the Communication Grounding System shall be performed under the direction and supervision of the Contractor's designated Project Registered Communications Distribution Designer (RCDD).

3.2 TELECOMMUNICATIONS GROUNDING BUS BARS

A. The TMGB shall be located within 20 feet of the MDP equipment, as per the NEC, or a redundant supplemental grounding electrode shall be provided at the entrance facility/TMGB.

B. The TMGB shall be located in the entrance facility adjacent to the building entrance protection equipment.

C. The Telecommunication Grounding Bus Bars shall be wall mounted on the telephone backboard at 24" AFF in a protected location, adjacent to the "TBB" entrance point, near the local electrical power receptacle distribution panel, and accessible to the Telecommunication Room (TR) ladder rack system as indicated on the drawings or directed by the owner or engineer.

D. All ground distribution bus bars and grounding, and bonding conductors in cabinets, MDFs, BSFs, TRs, etc. shall be labeled and provided with a "WARNING" legend plate of engraved phenolic; green letters of 3/16" and 1/8" in height on a white background minimum, sized 3" wide x 1-1/2" high, reading "WARNING - If connectors or cables are loose or must be removed - Please contact the consultant immediately."

E. All conductors attached to the TMGB/TGB shall be permanently labeled indicating from/to termination (i.e. TGB-301/Rack #2).

F. An equipment ground bar shall be mounted on the rear side of all 19" equipment racks and cabinets. All active equipment (i.e. hubs, switches, concentrators, etc.) and shielded cable grounding towers or frames, etc. on the indicated rack shall be bonded to the rack ground bar. In turn, the rack ground bar shall be bonded with a #6 ground to the "TGB/TMGB".

G. Items to be bonded to the Communication Grounding System at the ground distribution bus bars shall include, but not be limited to the following:

1. Telephone Equipment (e.g. PBX's, KSU's, ISDN equipment, etc.)
2. CATV Equipment
3. Equipment Racks and Cabinets
4. Cable Ladders, Trays and Channels
5. Surface Mounted Metallic Raceways and Wireways
6. Metallic Conduit Systems
7. Service Entrance Protected Terminals
8. Communications and Fiber Optic Splice Enclosures
9. Interbuilding Cable Sheaths and Messengers
10. Coupled Bonding Conductors
11. Paging and Access Control Systems

H. The positioning of ground terminators on the telecommunication ground bus bar shall be specific to the grounding function. Starting at one end of the ground bar, terminate across the ground bar as follows:

I. The first group on the starting end should be the branch circuit non-isolated equipment grounds.

J. All fault current dissipation paths are to be grouped next (i.e. panel grounds, feeder circuit grounds, etc.).

K. All transient sources are to be grouped next.

L. The main grounding backbone (TBB) conductors are to be terminated in the middle.

M. All isolated equipment grounds are to be grouped next.

N. All signal reference grounds are to be grouped at the finishing end (i.e. dedicated grounds to cable shield grounding towers, dedicated grounds to equipment ground lugs isolated from the power cord ground pin, etc.).

3.3 BONDING BACKBONE CONDUCTOR AND BONDING CONDUCTORS

A. A Communication Grounding System backbone cable shall be provided, tying all communication wiring closets, cabinets, etc. to a common ground point. The Telecommunication Bonding Backbone (TBB) shall be equal to the electrical service entrance ground or a minimum of a #2 AWG copper conductor.

B. The TBB shall originate from the TMBG, and be continuous to the farthest TGB.

C. The only connections to the TBB shall be taps for intermediate TGBs.

D. All other bonding connections shall be made to the TMGB/TGBs

E. The Telecommunication Bonding Backbone (TBB) shall be tapped and terminated on the Telecommunication Grounding Bus bar (TGB), in the intermediate wiring closets and/or on appropriate welded ground studs/lugs in communication cabinets.

F. Bonding and grounding conductors shall originate from the ground distribution bus bars (TMGB/TGB), to all communication equipment, racks, raceways, service entrance protection, surge protection, local power distribution panels, building structural steel, etc.

G. All bonding conductors and connectors shall be UL listed for the purpose intended. All bonding conductors shall be insulated stranded copper, minimum conductor size of #6 AWG, and colored green.

H. Bonding and grounding conductors should not be placed in ferrous metallic conduit. If it is necessary to place grounding and bonding conductors in ferrous metallic conduit, the conduit shall be bonded to the grounding conductor, for conduits that exceed 3'-0" in length, the conduits shall be bonded at each end to the conductor with a #6 AWG sized copper conductor minimum.

I. Whenever two or more vertical Telecommunication Bonding Backbone (TBB) are required up through and within a multi-story building, the backbone cables shall be bonded together with an equivalent TBB sized Telecommunication Ground Equalizing Conductor (TGEC) at the top floor, and at a minimum of every third floor in between.

J. The Communication Grounding System backbone cables and bonding conductors shall be installed without splices whenever possible. Where splices are necessary, they shall be minimal in quantity, accessible and located in communication spaces only. All splices shall be approved by the Engineer. The locations of all splices shall be indicated on the "as-built" drawings.

K. Joined segments of Communication Grounding System shall be connected using only irreversible compression-type connectors, exothermic welding, or Engineered approved equivalent.

L. Grounding and bonding conductors shall be provided to all individual pieces of equipment. "Daisy Chaining" of ground bonding conductors shall be minimized and shall be limited to similar pieces or types of static infrastructure elements only (i.e. conduit stubs).

M. In Telecommunications Room installations a maximum of three (3) adjacent rack/cabinets may share a common bonding conductor to the TMCB/TGB. The multi-point bonding conductor shall be configured in a "crow's foot" pattern. "Daisy Chaining" is unacceptable.

N. Bonding conductors shall be provided between equipment elements in lieu of the unreliable physical electrical continuity through the mounting means.

O. A #6 bonding cable shall be run through, lugged and connected across each section joint of telecommunications cable trays.

P. This bonding cable shall not be utilized as the TBB.

Q. All cable tray segments shall be bonded to the TMGB/TGB in the TR/ER and together in the field.

R. All grounding and bonding conductors shall be insulated stranded copper, colored green tape, minimum conductor size #6 AWG. Bare copper conductor should only be utilized when exposed in plenum or riser rated areas or buried below grade.

S. Where a bare copper Telecommunication Bonding Backbone (TBB) conductor or bonding conductor is routed through a cable tray system, the conductor shall be routed in CMP/CMR rated innerduct. The "TBB" shall be isolated from the raceway system, except for the raceway bonding jumpers to the "TMGB/TGB".

T. The data/telecommunication raceway bonding system (not the TBB) shall be extended to and through data/communication raceways such as cable trays, cable channels, ladder systems, metallic surface mounted raceways, etc. by means of extending a #6 AWG minimum bonding conductor through the length of the raceway system and lugging to each section of raceway, lugging at 10 foot maximum intervals along the length of the raceway, and lugging to any section of raceway three feet or greater in length in lieu of the installation of individual bonding jumpers between each raceway section.

U. Extend bonding jumpers to and through all pull boxes and/or transition fittings along the raceway system. The bonding conductor shall be extended through conduit or conduit sleeves connecting sections of cable tray, channel, ladder or metallic raceway systems.

V. Individual continuous "zone" conduits shall be bonded to ground at the "home" end, with a bonding jumper installed to and through all pull boxes. Bond the conduit at the "zone" end to building steel as available.

W. All grounding and bonding conductors shall be maintained as short and straight as possible, with the maximum radius bends practical (20x conductor dia.), in no case should the minimum bend radius be less than 10x the conductor diameter. Daisy Chaining of grounding and bonding conductors shall be unacceptable.

X. All grounding and bonding conductors shall be free from loops and coils (either partial or full), no bends shall be greater than 90°.

Y. All grounding and bonding conductors shall be protected from physical damage, the conductor shall not be run exposed across the floor or strung from item to item without intermediate support and protection. Route grounding and bonding conductors to provide physical protection and support or route in conduit.

Z. Grounding and bonding conductors shall be provided to all items and equipment elements in lieu of the unreliable physical mounting means for electrical continuity. The utilization of conduit fittings, mounting hardware, support hardware or the attachment hardware for providing grounding and bonding in lieu of a grounding and bonding conductor is not acceptable.

3.4 GROUNDING CLAMPS AND BUSHINGS

A. All communications conduits shall be bonded and grounded to the local TMGB/TGB.

B. Communications conduits shall be provided with insulated grounding bushings.

C. Where a grounding bushing has not been installed on an existing conduit and can not be installed due to a previously installed cable base, a U.L. listed, bonding and grounding clamp (T&B Type-J or equal) shall be installed on the end of the conduit adjacent to the existing bushing fitting. Attach the compression type ground lug to the bonding and grounding clamp using a stainless steel machine screw and star washer.

D. In existing locations where there is insufficient space to install a standard grounding clamp, a U.L. Listed grounding wedge may be utilized with the Engineer's approval.

E. Exposed grounding and bonding conductors entering cabinets and enclosures shall be provided with a rubber grommet or chase nipple and bushing. Install grommets or bushings.

F. A grounding bushing shall be utilized on each conduit to bond the conduit to ground, discard the setscrew type clamp provided and bolt the compression type ground lug directly to the bushing using a stainless steel machine screw and star washer.

G. Grounding bushings shall be utilized on each conduit which is not bonded to a grounded enclosure by means of properly installed conduit nuts, one on each side of the enclosure panel and properly tightened such as to cut through the panel paint and make bare metal to metal contact.

3.5 GROUNDING RODS AND ELECTRODES

A. Grounding rods and electrodes shall be installed exterior of the facility structure.

B. Ground rods and electrodes installed through the floor of a facility are unacceptable.

C. Ground rods and electrodes shall be installed a minimum of one (1) rod length or a minimum of 10 feet from the foundation or footer, on the exterior side.

D. The top of the ground rod or electrode shall be a minimum of 36" below grade or 6" minimum below the frost line, whichever is greater.

E. Exceptions shall be approved in writing by the Engineer.

F. Ground rods and electrodes located in paved areas shall be of sufficient length to penetrate beyond the water table by a minimum of 8' and shall be provided with access wells.

G. Connections to ground rods and electrodes shall be by means of Exothermic Welding only. Mechanical connections are unacceptable.

H. Exothermic Weld connections only shall be utilized below grade.

I. Where there is insufficient topsoil above bedrock to vertically drive the ground rod or bury the electrode, the Contractor shall bore a hole for the rod or excavate a hole for the electrode to meet the minimum depth requirements.

J. The ground rod or electrode shall be buried in a cavity providing 2" minimum of ground enhancement material all around.

3.6 GROUND LUGS AND HARDWARE

A. Stainless steel star washers shall be utilized; split ring washers are not acceptable (except on the ground bus bar as part of the ground bus bar kit). The star washer to be located under the nut.

B. Setscrew type and/or box lug type terminations and split-bolt type connectors are not acceptable for the Communication Grounding System, Contractor to replace all such fittings with irreversible compression type connectors and lugs.

C. All connections, joints and conductors shall be adequately supported and protected.

D. Two (2) hole compression lugs only shall be utilized on the grounding system backbone cables where attached to the grounding system distribution bus bars, and the electrical service entrance equipment (MDP) ground bus bar.

E. Two (2) hole lugs shall also be utilized when attaching an external building ground grid to the Telecommunications Main Grounding Bus bar (TMGB).

F. Wherever possible, the two-hole compression lug shall be bolted down using two (2) bolts. When the two-hole compression lug can only utilize one-hole, always utilize the hole nearest the compression fitting, cut-off excessive tang length.

G. The Contractor shall provide oxide inhibiting joint compound on all compression, nut and bolt, and mechanical type terminations.

H. Stainless steel machine screws, nuts, bolts and star washers shall be used for all grounding hardware and fasteners.

I. Common zinc-clad or nickel-plated steel hardware fasteners are not acceptable. Replace all zinc-clad/nickel-plated hardware with specified stainless steel hardware.

J. Mechanical connection points to trays, ladders, frames, chassis, enclosures, etc. shall be neatly burnished on both sides to remove the finishes and expose bare metal for a positive electrical connection.

K. All burnished surfaces shall be primed and painted to match after the bonding connection is completed.

L. Mechanical ground connections to trays, ladders, frames, chassis, enclosures, conduits, etc. shall be made using dedicated grounding hardware to the main equipment structure. Multi-purpose use of equipment structure hardware or attachment to equipment accessories or sub-structures (i.e. gussets, brackets, hangers, mounting brackets, etc.) is not acceptable.

3.7 EXISTING GROUNDING SYSTEM INSTALLATION VERIFICATION

A. The Contractor shall inspect and verify all the existing grounding systems to which attachments are being made, which shall include but not be limited to the following:

1. Electrical Service Entrance Grounding
2. Telephone Service Entrance Grounding
3. Electrical System(s) Grounding
4. Structural Building Steel Grounding
5. Conduit and Raceway System(s) Grounding
6. Natural Gas Line Grounding
7. Ground Connection to the Source Side of Water Meter and the Water Meter Bonding Jumper

B. Existing grounding systems shall be checked, cleaned, re-tightened and/or re-made with a suitable anti-oxidant applied, to bring them up to code and standards. Discrepancies in existing systems shall be brought to the attention of the Owner and Engineer in writing, for additional corrective action.

C. The Contractor shall include a written report with the system grounding Test Form #1. The written report shall detail the inspection, service required or performed and verification procedures of the existing grounding systems performed by the Contractor and shall detail the findings and any actions taken (i.e. existing #4 ground conductor from main tel-brd and ground clamp removed from service side of water meter, all connections cleaned and burnished, anti-oxidant applied, reassembled and tightened).

3.8 INTERBUILDING OUTSIDE PLANT GROUNDING AND BONDING

A. Underground Ductbank and Manhole Installation:

1. Each manhole or vault with a cast iron cover and frame, and/or metallic conduits entering shall have a ground rod installed, driven through the knock-out provided in the bottom of the enclosure.
2. Bond the cast iron cover frame, metallic conduits and other metallic structures to the ground rod with a minimum #6 AWG insulated solid copper conductor. Exothermic weld the bonding conductor to the frame and ground rod.

3. Provide a minimum #6 AWG copper bonding conductor through all conduits. Bond the conductor to the ground rod.
4. Bond all metallic conduits to the ground rod with a minimum #6 AWG copper bonding conductor.
5. Route the bonding conductors along the sides of the enclosure as to minimize exposure and protect from damage. Provide cable clamps to maintain support and position.

B. Aerial Installations:

1. When utilizing utility company pole lines for aerial cable installations, specifications and requirements of the utility company may supersede the requirements of the drawings and specifications herein, as applicable. In either case, the more stringent specification shall prevail.
2. Outdoor/aerial cable is not normally a self-supporting. It must be supported by a messenger wire with cable lashing unless otherwise noted.
3. Provide pole protection on non-metallic poles by means of a #6 AWG copper down conductor fastened to the pole from top to bottom. The pole grounding conductor serves as the ground path for the shield cable above and the messenger wire, and must be grounded at the pole base by means of a copperweld ground rod.
4. Down conductor spacing on leased utility pole lines shall be 0.4 kM (0.25 miles) or less.
5. Down conductor spacing on University Owned Outside Plant (COSP) pole lines shall be 110M (400') or less.
6. When metallic poles are used, the pole may serve as the down conductor if it is suitably grounded at the base and if the messenger wire and shield cable are bonded to the pole.
7. Power lines can provide shielding for the communication lines, in lieu of a shield cable above. Shield cable shall be a 3/8" diameter utility grade, galvanized, 7-strand messenger cable. Shield cable to be located 1M (3.3 feet) minimum above the data/communication cable messenger.
8. When data/communication cables are run jointly with power cables on the same pole line, the messengers should be bonded to the multi-grounded neutral. The multi-grounded neutral may be used in lieu of the earth driven ground rod and pole grounding wire, provided the installation meets requirements of the ground potential difference and ground path resistance tests. Bond all ground points to the power company multi-grounded neutral.
9. In order to meet requirements of the ground potential difference and ground path resistance tests, it may be necessary for the Contractor to install a buried counterpoise ground wire below the frost line along the length of the pole line. The counterpoise to be #6 AWG or larger bare copper conductor and should have all pole grounds and building grounds bonded to it.

C. Tunnel System Installations:

1. Tunnel systems shall be dry and have provisions for positive drainage. Raceway in the tunnel system should be enclosed conduit or appropriate cable tray system per N.E.C. Article 318.
2. A minimum #6 AWG or larger ground conductor shall be run through the tray and bonded to the tray sections and to the grounding systems at each end.
3. Metallic conduits shall be bonded to the grounding systems at each end.
4. Tunnel terminations, entrances and intersections shall be treated as manholes, similarly bonded and grounded.
5. Long tunnel segments shall have intermediate ground rod and bonding conductors installed at a minimum of 300M (1000') on center.
6. Exterior/Emergency Telephone and CCTV Camera Installations:
7. Poles and enclosures for mounting exterior emergency telephones and CCTV security cameras shall be bonded to ground by means of a ground rod and a minimum #6 AWG copper conductor.

8. The metallic pole, phone housing, camera housing, light fixture, phone instrument, camera, surge suppression and all other metallic items shall be bonded together and to the ground rod.

3.9 SYSTEM TESTING

A. Upon completion of the installation of the Communication Grounding System and/or servicing of the existing grounding systems, the Contractor shall perform approved standard ground resistance tests with an Owner and Engineer approved ground resistance test instrument (i.e. stakeless clamp-on ground resistance tester, two-point and three-point fall of potential tester), using approved procedures as noted in this specification.

B. "CAUTION" - Never assume a ground wire is electrically dead without first testing to be sure. Always test for and record, the voltage and current on the ground conductor at the test point prior to measuring ground resistance. Erroneous ground resistance measurements may result if the ground current exceeds 2 Amps AC. Contractor shall identify sources of high ground current before proceeding with ground testing.

C. NOTE: By measuring for voltage, current and resistance at several points and comparing the readings, it is possible to identify neutral/ground loops, utility grounds and central office grounds. The tests are effective and accurate because the ground conductor should be connected to the utility ground at only one point, according to standard practices and NEC. A reading of less than 0.1 Ohms generally indicates that the cable is continuous with itself, providing an acceptable ground path, which can usually be confirmed by comparatively minimal ground current readings. The source of a ground current may be obtained when readings are taken at multiple locations around the circuit. A good low resistance ground may have very high AC ground current flow (> 2 Amps), depending upon the type of equipment being grounded.

D. The Contractor shall inspect, service and verify all of the grounding systems as per this specification section. Failures of the existing grounding systems to meet the intent of Specification Section 26 0526 shall be brought to the attention of the Engineer and Owner in writing.

E. The Contractor shall perform Telecommunication Grounding System Testing as follows:

1. Utilizing the Electrical Service Entrance Point Neutral Ground Bonding Point as the Test Reference Point, measure voltage, ground current and ground resistance on all Telecommunications Bonding Backbone (TBB) conductors at each "TMGB/TGB".
2. Measure voltage, ground current and ground resistance readings on all bonding jumpers at each "TMGB/TGB".
3. Extend the common test lead from the common test point through the facility to the furthest area for testing and work your way back to the starting point. Retain the test instrument with you as you work your way through the facility. Always maintain the full length of the test leads in play.
4. Upon completion of taking all the required test readings and returning to the common test point, short the two (2) test leads together and record the voltage, current and resistance (voltage and curtrent should equal zero (0), if there is current or voltage present, test results will be invalid). In the absence of current or voltage, the resistance reading of the leads shorted together becomes the "Test Rare Value". The difference between the Tare Value and the resistance recorded at the various tested points equals the system resistance.
5. Record all readings on Test Form #1. Contractor to reproduce Test Form #1.

F. Where test results indicate a ground current of 1 Amp or greater, the Contractor shall take appropriate action to identify and reduce the ground current to less than 1 Amp. The Contractor shall notify the Engineer in writing of the excessive ground current, the source and action taken to reduce the current.

G. The Contractor shall demonstrate by testing that the communication grounding system to earth resistance value is 5 Ohms or less, utilizing a "clamp-on" or 3 point fall of potential tester.

H. The Contractor shall be able to demonstrate by test that the communication grounding system resistance from any grounded non-current carry conductor in the system to the electrical service entrance neutral/ground bonding conductor is less than 0.1 Ohms.

I. The Contractor shall record the test results on Test Report Form 1 included herein, and provide a description of the testing procedures for submission to the Engineer for approval.

J. Ten (10) days prior to the communication system completion date the Contractor will provide the Engineer and the Owner the following:

1. A description of the testing procedures used including the make and model of the testing instrument.
2. A copy of Test Report Form 1.
3. The written report shall detail the inspection, service and verification procedures of the existing grounding systems performed by the Contractor and shall detail the findings and any actions taken (e.g. existing #4 ground conductor from main tel-brd and ground clamp removed from service side of water meter, all connections cleaned and burnished, anti-oxidant applied, reassembled and tightened).
4. An 8-1/2" x 11" sketch produced in CAD of the Tele-communications Grounding System in Riser Diagram format, identifying the TMGB/TGB locations, TBB routing between and all bonding connections to the ground bus bars.
5. A list by ground bar in an excel spreadsheet listing each ground wire attached to the ground bar and what the ground wire is attached to.
6. Provide all this information in hard copy and electronically.
7. Contractor shall include copies of the completed and approved test report in the cabling system instruction manuals.

END OF SECTION

SECTION 27 05 28

PATHWAYS FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and install a complete structured cabling hanger and support system including all cable trays, j-hooks, channels, wireways, etc. as indicated on the drawings, specified or as otherwise required.

B. Cable runs of 18 or more cables are required to be supported by cable trays.

PART 2 - PRODUCTS

2.1 CABLE TRAYS

A. Cable trays shall be as indicated on the Engineering Drawings and sized as per Table-1, contained herein.

B. Cable trays (outside of MDF and TR rooms) shall be trapeze hung and sway braced.

C. Industrial type, single-piece, formed aluminum trough cable tray for heavy cable loads and large cables shall be Chalfant Ladder Tray or Type 156 by B-Line, 4” usable depth and 9” rungs as indicated on the drawings. The tray shall be either Trapeze or wall mounted.

D. Communication Ladder Runway (inside MDF and TR rooms) shall be trapeze hung and sway braced.

E. Industrial type, single-piece, 16-ga fully welded tubular steel w/ 2-layer black powder coat finish with 9” rungs as indicated on the drawings. The tray shall be either Trapeze or wall mounted 8’-0” A.

F. Unless otherwise noted on the Drawings, cable tray shall be 12 inches wide.

G. Unless otherwise noted on the Drawings, cable tray shall have a usable minimum loading depth of 4 inches deep.

H. Cable tray used in open ceilings in finished areas and storage rooms will be solid bottom.

I. Cable trays will not be permitted in mechanical rooms, electrical rooms or any wet or damp rooms. In these area conduits are required.

J. Cable tray installation shall meet all applicable UL standard requirements for use as an equipment ground conductor.

K. Straight sections shall be a maximum nominal 10-foot length.

L. Straight sections and fittings shall be assembled with nut and bolted splice plates. Hardware shall be zinc plated. Spring loaded and "snap" type fittings are not acceptable.

M. Factory end plates and fittings shall match the tray width, depth and metal type.

N. All changes in elevation of the cable tray or where cable leaves the cable tray factory produced radius drop offs, waterfalls and other devices will be used to ensure the proper cable bend radius is maintained.

O. The cable tray system shall be U.L. Listed and classified with applicable U.L. labels applied.

P. Spaces (hallways or rooms) where a cable tray is located with conduits from voice and data outlets will be terminated within 10” and 2” above the cable tray.

2.2 J-HOOKS, CABLE HANGER AND TIES

A. Non-metallic cable support systems such as J-hooks, ties, etc. must be CMP, plenum rated or CMR, riser rated, where applicable. Panduit J-Pro J-hooks Caddy brand “Cable-Cat” hangers or owner and engineer approved equal.

B. Metallic cable support systems such as J-hooks or Caddy brand “Cable-Cat” hangers must be CMP, plenum rated.

C. J-hooks shall provide a fully radiused support structure with no tight corners to pinch or bind cables, must provide a minimum 1" wide load bearing surface with a minimum 1/4" radius edge.

D. Cable support system devices shall be provided complete with cable retainer.

E. Cable installation accessories (e.g. pulleys for J-hooks) may be provided and utilized as applicable in compliance with TIA/EIA standards and other sections of the 270000 specifications.

F. "Velcro" type cable wraps shall be utilized for cable management only, in the horizontal plane and the vertical plane in MDF, BDF, TR and data cabinets. “Velcro” may not be used in other locations requiring vertical support.

G. Cable ties of a minimum 0.190" width, installed in a figure 8 pattern around the support member and crossing over the cable/cables shall be utilized for cable management and support in a vertical plane.

H. Maximum cable bundle (4UTP) size of 24 to 36 cables, supported with ties on 36" to 24" centers. (e.g.: 24 cables – 36" on center, 36 cables – 24" on center.)

I. J-Hooks will not be used to support cable runs of 18 or more cables. J-hooks will only be used within rooms with suspended ceilings to concentrate cable to cable trays unless authorized by the Engineer or Owner to install in additional locations.

2.3 METALLIC "D" RINGS

A. Round aluminum "D" rings, sized as required shall be installed to support cables to the 110 cross connect fields.

B. "D" rings shall be Allen Tel Series "GB"

C. Plastic “D” Rings are not acceptable.

2.4 CONDUITS

A. Conduits shall be installed per raceway specifications of this specification except as noted. The sizes of conduits shall be as shown on the drawings, minimum size is 1.25". All conduits shall be reamed and furnished with insulation and/or grounded bushings as required.

B. Flexible Steel Conduit

1. Flexible steel conduits are not acceptable for communication systems installations

C. Rigid and Intermediate Metal Conduit (IMC)

1. Conduit shall be steel, hot dipped zinc galvanized (min. .0008 in thick) inside and out, with circular cross section, uniform wall thickness, continuously welded seams and chamfered threaded ends. Conduit shall be furnished in ten foot standard lengths.

D. Electrical Metallic Tubing (EMT)

1. EMT shall be zinc galvanized (min. .0008 in thick) inside and out, with circular cross section, uniform wall thickness and continuously welded seams. EMT shall be furnished in ten foot standard lengths.

E. Electrical Non-Metallic Tubing (ENT)

1. ENT for use in buildings in accordance with Article 362 of the NEC. ENT shall be provided in standard coil lengths. Orange ENT will be used for communications cable.

F. Liquid-Tight Flexible Steel Conduit

1. Conduit shall be hot dipped zinc galvanized inside and out and made from one continuous length of high grade steel strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.
2. Conduit shall have a continuous PVC jacket enclosing it.

G. PVC Conduit

1. PVC conduit shall be rigid non-metallic Schedule 40 heavy wall.
2. Conduits carrying fiber cables should have large labels indicating “Fiber Optic cable.” These labels should be placed every 10 feet where exposed.
3. Buried conduits must have yellow “Caution Fiber Optic” tape laid 12 inches above duct bank.

2.5 WORK OUTLET BACK BOXES

A. Each communications outlet shall receive a back box as noted on the drawings. Conduit to turn towards the main cable routing path or cable tray and have an insulated bushing installed. Conduits extended to the cable tray and/or otherwise extended beyond the turn out, shall have a grounding bushing installed and be bonded to the data/telecommunication grounding system.

B. In rooms with cable trays, conduits will be terminated with a grounding bushing within 10” of the cable tray and 2” above the side of the cable tray. The conduit will be grounded to the cable tray.

C. Communications outlet mounting height shall be ADA compliant, 18" to the top of the box above finished floor (A.F.F.) unless noted otherwise (Contractor to verify). Each communications outlet shall be provided with a matching blank cover plate unless noted otherwise. Outlet faceplates shall be as noted on the drawings.

2.6 BOX ELIMINATOR MOUNTING PLATES

A. Every attempt shall be made to route the cables within the walls. With the Owner and Engineer's prior approval, at locations where pre-stubbed conduits and outlet boxes have not or can not be installed in the wall, the Contractor shall install an approved single gang and/or double gang mounting plate/bracket (e.g. Caddy #MPLS, MPLS2, Arlington #LV1, LV2 or Owner and Engineer approved equal), and "fish" the cables within the existing wall structure, to a location above the ceiling.

B. The Contractor shall furnish and install an approved bushing or grommet in all studs and/or drywall to prevent damage to cables. Minimum grommet/bushing size shall be 1.25" I.D.

C. In those locations where data/communication cables must be fished through a concrete block wall to a "mudded-in" rework box, the Contractor shall "fish" the wall with an approved convoluted sleeving, non-metallic tubing as required to prevent damage to the cable.

D. The Contractor shall insure that all faceplates, labels, and associated items are properly aligned, centered and installed perpendicular and/or parallel to the floor.

E. All wall openings shall be neatly cut and trimmed with a drywall saw. Use of a proper template and "Roto Zip" is recommended. No rough or exposed edges will be permitted.

F. The faceplate shall be mounted to the box eliminator and shall be neatly installed and plumb to the floor. No exposed cables will be permitted.

2.7 PULL BOXES AND FITTINGS

A. Pull boxes shall be constructed of code gauge steel, etched, primed and shall have rust resistant ANSI 61 gray finish and be NEMA 1 construction with screw covers unless noted otherwise. For conduits 1-1/4" and larger terminating in a pull box, the minimum length of pull box shall be 8 times the diameter of the largest conduit terminating in the pull box. Splice boxes shall be sized as per EIA/TIA-569A Table 5.2-3.

B. Pull boxes shall be placed in straight sections of conduit runs and should not be used in lieu of a bend without approval of the Engineer. Pull boxes and/or splice boxes shall be installed in readily accessible locations. Where boxes are installed above suspended ceilings, they shall be located immediately above the suspended ceiling or the ceiling shall have a suitably marked and hinged panel or equivalent to facilitate direct access to the pull box.

C. Location and sizes of pull boxes and splice boxes shall meet the approval of the Owner and Engineer. Condulete type fittings (e.g. LB's, etc.) shall not be used in lieu of pull boxes or bends.

D. Exposed pull boxes in public areas shall be provided with tamperproof screws.

E. Boxes shall be provided without knockouts and shall not have any open or unused knockouts or other openings.

F. Pull boxes for indoor wet or damp locations shall be NEMA 3R Rated with stainless steel screws. Pull boxes 12” x 12” or larger will have hinged covers.

G. Pull boxes for outdoor locations shall be NEMA 4X Rated stainless steel continuous hinges, door clamps and a hasp.

2.8 CONDUIT FITTINGS

A. All rigid, IMC and EMT fittings shall be galvanized malleable iron or steel. Connectors and couplings shall be threaded, setscrew or compression type, concrete-tight.

B. Conduit bodies shall be malleable iron, threaded type. Provide neoprene cover gaskets for conduit body covers exposed to the weather.

C. Expansion fittings shall be O-Z/Gedney Type "AX" for rigid metal conduit and Type "TX" for electrical metallic tubing. For intermediate metal conduit applications, a 15 inch minimum length of rigid metal conduit shall be used with a Type "AX" expansion fitting. Provide O-Z/Gedney Type "BJ" bonding jumpers at all expansion fittings.

D. Rigid and IMC conduit bushings shall be of the insulated type with phenolic thermosetting insulation molded to a hot dipped galvanized malleable iron body of the threaded type.

E. EMT fittings shall be of the insulated throat type. Fittings larger than 2-1/2 inches shall have threaded bushings installed.

F. PVC conduit fittings shall be slip joint type.

G. All conduit sleeves will be fitted with “spillways” to maintain the bend radius of cables passing through the sleeve.

2.9 INNER DUCTS

A. Contractor to provide 1" slit corrugated inner duct over all exposed sections of fiber optic cables in the MDF's, BDF's and TR's.

B. Contractor to provide 1" slit corrugated inner duct over all sections of fiber optic cables run exposed in cable trays or otherwise exposed in ceilings and open wiring environments.

C. Contractor to provide spare 1" split corrugated inner ducts where indicated on the Engineering Drawings and as required by these specifications.

D. Contractor to provide four (4) 1" inner-duct as manufactured by Carlon in activated 4" telecommunications conduits. Each inner-duct will have a pull tape installed.

E. All fiber optic cable installed in conduits shall be installed in an inner duct of the appropriate size as indicated on the Engineering Drawings and as required by these specifications, unless the conduit is sized so only the fiber optic cable is installed in the conduit.

F. Contractor shall provide a pull tape in each inner duct.

G. Inner ducts shall be provided as individual continuous runs, free from interruptions and splices except where limited by the available reel length.

H. Breaks or splices in inner duct shall be exposed or located in pull boxes only.

I. Corrugated slit inner duct shall be riser or plenum rated as required, as manufactured by Carlon/Pyramid.

J. Contractor to utilize vendor manufactured couplings only for splicing the corrugated inner duct as per manufacturer's directions.

K. Contractor to provide vendor manufactured threaded aluminum couplings to join ribbed inner duct to the split corrugated inner duct.

L. Contractor to follow the manufacturer's installation instructions closely for the inner duct and cable guide.

M. Cables installed in exposed inner ducts shall be of the same riser/plenum rating as the inner duct.

N. Inner-duct should have large labels indicating “Fiber Optic cable.” These labels should be placed every 10 feet where exposed.

2.10 FLOOR BOXES

A. Boxes to have independent wiring compartments to allow for power receptacles and communication connections within the same box

B. On-grade boxes to be cast-iron, and above grade, in-slab boxes to be steel.

C. Boxes to be fully adjustable, before and after the concrete pour.

D. UL Listed

E. Flangeless covers in die-cast aluminum with brushed aluminum finish.

F. Contractor to provide all parts, pieces, and accessories required for a working floor box system.

G. Refer to Data drawings for quantities, locations.

H. Wiremold RFB4 and RFB6

2.11 VERICAL CABLE PATHS

A. All cable should be placed inside walls and wall caddies installed. When cable must be routed externally, surface raceways and boxes should be anchored with screws.

B. Acceptable surface raceways are:

C. Panduit Pan-way PD3IW(6,7,10)-A with base, cover, and adhesive backing (must be anchored by screws).

D. Acceptable wall caddies are:

E. Leviton single/dual gang 427777-(1,2)(I,W,G,E)A surface mount boxes.

2.12 WALL COVERING

A. Install 8’ high by 4’ wide by ¾” AC grade plywood with A side facing out on walls of MDF and TRs as indicated on data plan drawings. Plywood to be painted with fire rated paint.

2.13 WIRELESS ACCESS POINT INFRASTRUCTURE

A. Each wireless access point (WAP) outlet shall be a 4-11/16" square double gang deep (2-1/8" deep) box with raised single gang plaster ring as required. Back box will be flush mounted in drop tile or hard lid ceiling or surface mounted to bottom of structure in open ceiling. Where box not accessible or is exposed provide a 3/4" conduit stubbed out to accessible ceiling or cable tray. Conduit to turn towards the main cable routing path or cable tray and have an insulated bushing installed.

B. In rooms with cable trays, conduits will be terminated with a grounding bushing within 10” of the cable tray and 2” above the side of the cable tray. The conduit will be grounded to the cable tray.

C. Areas constructed with hard ceilings will require at least a 12x12 access panel in order to install and service the Access Points. Access panel to be provided and installed by 270528.

D. Provide 15ft. of coiled wire in the location indicated on drawings. Terminate cable with RJ45 punch down block in WAP back box.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Where indicated on the Drawings and in the contract documents, cable trays and/or cable channel shall be furnished and installed by the Contractor.

B. Cable trays and cable channels shall be as indicated on the Drawings or Owner and Engineer approved equal and sized as per Table-1 herein. Contractor to verify the size and fill requirements.

C. The Contractor shall furnish and install additional cable tray and channels per specification as required to facilitate the data/communication cabling installation. The minimum required installation is indicated on the Drawings.

D. Cable trays and channels shall be installed per manufacturer's recommendations and instructions, utilizing manufacturer's accessories and components.

E. All cable trays, channels, and supporting unistrut and brackets shall be cleanly cut with an appropriate metal cut-off saw and be clean and free of all burrs and sharp edges. Owner and Engineer shall approve all fabrications.

F. Minimum bend radius for cable tray or channel shall be 12" when utilized for data/telecommunication cables, unless noted otherwise.

G. Cable trays and channels shall be supported from building structure above on 10'-0" centers maximum or less as required per manufacturer's instructions unless noted otherwise. Ceiling grid supports may not be used at anytime to support communication cable, hangers or supports.

H. The Contractor shall verify cable tray and channel loading requirements, and install the raceway system as per the manufacturer's recommendations and directions. The Contractor shall size and support the raceway system for 100% future growth and expansion.

I. The Contractor shall provide all end caps, tube caps, mounting spacers, couplings, hangers, brackets, dropouts, connectors, supports, braces and other manufacturer's accessories and components as required to provide a complete and functional installation.

J. Raceway systems shall be bonded to the telecommunications grounding system, as per N.E.C. Article 250, EIA/TIA 607 standard and Section 270526.

K. The Contractor shall submit 30 days prior to commencement of installation or as otherwise directed for Owner and Engineer review and acceptance, drawings indicating cable tray, conduit or other raceway routing, size, cable fill, etc. as required to verify that the installation will meet all aspects of the Specification.

L. Whenever possible, cable and raceway routing paths shall follow the logical structure of the building (e.g. follow hallways, aisles and corridors). When rated walls must be breached, cables shall pass through pre-established EZ-Paths ganged together to equal the full capacity of the cable tray. Cables shall enter and/or exit areas at right angles to the structure. Route all data/communication cables and raceways parallel to or perpendicular to the building structure. No diagonal runs will be permitted unless noted otherwise or pre-approved by the Owner and Engineer. Corridor crossovers shall be kept to a minimum.

M. Coordinate layout of cable tray and cable channel including specific routing and mounting elevations with building structure and work of other trades. Provide additional elbows and fittings as required to facilitate changes in elevation of cable tray and cable channel to avoid conflicts with building structure and work of other trades.

N. All splice plates shall be installed in a manner to maintain the integrity of the cable tray and cable channel as an equipment grounding conductor. Install bonding jumpers across expansion and adjustable splice plates.

O. Cable trays and cable channels are for low voltage voice/data/CATV communication cables only. No other cables, including other low voltage cables for fire alarm, PA, HVAC-TC, etc. are permitted in tray or runway or attached to the outside of the cable tray.

P. Install end plates on cable tray and cable channels.

Q. Install cable tray from building structure using center hung type hangers. Cable tray shall be located above suspended lay-in ceilings but below HVAC ductwork and piping systems, unless otherwise noted. Cable tray support shall be per manufacturer's recommendations. Provide additional supports at expansion splices.

R. Ground cable tray to the ground bus bar and bond each joint with bonding jumpers for an integral ground. All metallic conduit stubs to the cable tray for telephone, data, and empty conduits for future communication system use shall be bonded to the cable tray to insure ground continuity between the different raceway systems.

S. Ground cable trays and cable channels with a #6 insulated conductor run to main telecommunications ground bus bar in non-plenum spaces. Cable tray shall not be used as an equipment grounding means. Cable trays in plenum spaces will be grounded with a #6 bare conductor run to main telecommunications ground bus bar.

T. Conduits attached to cable trays shall be secured with approved conduit clamps.

U. Data/communication cables that are routed above a suspended ceiling shall be supported by Owner and Engineer approved cable tray and channel or supported by Owner and an Engineer approved open ceiling distribution system. An open ceiling distribution system shall not be installed above inaccessible ceiling areas, such as "lock-in" type ceiling tiles, drywall or plaster. Suspended ceiling tiles shall be of the removable "lay-in" type, and located at a maximum height of 11'-0" above the floor. Adequate and suitable space shall be available in the ceiling area for the distribution system. A minimum of 6" of clearance space all around shall be available for the "open wiring" distribution system installation, this shall be clear accessible space not required for the removal of tile, light fixtures or for service and access to other systems.

V. Cables shall be supported on Panduit J-Pro cable Support System J-Hooks, Caddy brand “Cable-Cat” hangers or Owner and Engineer approved equal supports from the building structure, and shall be neatly bunched, bundled and routed above the suspended ceiling supported from the bar joist or trusses. The “open” wiring should be accessible from an 8’-0” stepladder. The suspended ceiling and/or lighting fixture support wire or rod shall not be utilized to support data/communication cables. Do not support cables from ductwork, plumbing lines, fire suppression or mechanical systems, etc. Do not lay data/ communication cables on ductwork, piping, plumbing systems or on top of lay-in ceiling tile and lighting fixtures.

TABLE-1 -- COMMUNICATION CABLE/RACEWAY FILL SCHEDULE

Cable Max. O.D. (in.)		0.13		0.18		0.22		0.24		0.29 (Note-5)		0.31		0.37	
Cable Area (sq. in.)		0.013		0.025		0.038		0.045		0.066		0.075		0.108	
Conduit Size (in.) Raceway/Tray Size	Avail. Area (sq. in.) (Note 3)	BICSI (Note-1)		BICSI		BICSI		BICSI		BICSI		BICSI		BICSI	
3" x 1" Channel	1.50	63		33		21		18		12		11		7	
4" x 1-3/4" Channel	3.50	148		78		51		43		29		26		18	
6" x 1-3/4" Channel	5.25	222		117		76		65		43		39		27	
6" x 3" Tray	9.00	381		201		130		112		75		67		46	
12" x 3" Tray	18.00	762		403		260		224		150		134		93	
18" x 3" Tray	27.00	1142		604		390		336		225		201		140	
24" x 3" Tray	36.00	1523		806		520		448		300		268		186	

Cable Max. O.D. (in.)		0.53		0.62		0.70		0.89		0.97		1.07		1.30		1.50	
Cable Area (sq. in.)		0.22		0.302		0.387		0.62		0.74		0.90		1.33		1.77	
Conduit Size (in.) Raceway/Tray Size	Avail. Area (sq. in.) (Note 3)	BICSI		BICSI		BICSI		BICSI		BICSI		BICSI		BICSI		BICSI	
3" x 1" Channel	1.50	3		2		2		1		1		0		0		0	
4" x 1-3/4" Channel	3.50	8		6		5		3		3		2		1		1	
6" x 1-3/4" Channel	5.25	13		9		7		4		5		3		2		1	
6" x 3" Tray	9.00	22		16		13		8		9		5		3		3	
12" x 3" Tray	18.00	45		33		26		16		18		11		7		5	
18" x 3" Tray	27.00	68		50		39		24		27		16		11		8	
24" x 3" Tray	36.00	91		66		52		32		36		22		14		10	

NOTES:

1. BICSI column equals BICSI/TDMM recommended maximum number of cables.
2. Recommended BICSI fill is based on EIA/TIA-569A guidelines and assumes no more than two 90° bends for a horizontal conduit run of 100 ft. max. and a 30% fill factor for the conduit.
3. Available area (square inch) calculated at 40% fill for conduits, 50% fill for tray/channel. Adjust conduit fill as required for 53% fill for one cable or 31% fill for two.
4. The Contractor shall be responsible for sizing the raceway to recommended BICSI/TDMM maximum fills for the initial installation.
5. Utilize 0.29 dia. for cable calculations.

TABLE-2 -- COMMUNICATION CABLE/CONDUIT FILL SCHEDULE

Inside Diameter mm	Trade Size	Cable Outside Diameter mm (in)									
		3.3 (0.13)	4.6 (0.18)	5.6 (0.22)	6.1 (0.24)	7.4 (0.29)	7.9 (0.31)	9.4 (0.37)	13.5 (0.53)	15.8 (0.62)	17.8 (0.70)
35	1-1/4	16	14	12	10	6	4	3	1	1	1
41	1-1/2	20	18	16	15	7	6	4	2	1	1
53	2	30	26	22	20	14	12	7	4	3	2
63	2-1/2	45	40	36	30	17	14	12	6	3	3
78	3	70	60	50	40	20	20	17	7	6	6
91	3-1/2	---	--	--	--	--	--	22	12	7	6
103	4	---	--	--	--	--	--	30	14	12	7

NOTES:
1. The Contractor shall be responsible for sizing the raceway to recommended BICSI/TDMM maximum fills for the initial installation.
2. Utilize 0.29 dia. for cable calculations.

W. All power devices and power sources emit a given amount of radio frequency interference (RFI) and/or electro-magnetic interference (EMI). To reduce or eliminate the field effects of RFI/EMI on data traffic on a given cable channel, cable runs shall be kept at the maximum possible distance from such sources. Running cables through the center of the building can reduce the external interference effects of RFI/EMI in the cable tray. Open wiring and non-metallic raceway shall be routed a minimum of twelve (12") inches away from fluorescent fixtures. Special attention shall be given to the routing of such pathways away from lighting ballasts and high intensity discharge devices. The minimum separation distances between data/communication distribution pathways and power wiring of 480 Volts or less shall be per Table-3 herein.

TABLE-3

SEPARATION OF DATA/COMMUNICATIONS PATHWAYS FROM ≤480V POWER LINES

CONDITION	MINIMUM SEPARATION DISTANCE		
	< 2 kVA	2-5 kVA	> 5 kVA
Unshielded power lines or electrical equipment in proximity to open or nonmetal tel/comm pathways.	6 in	12 in	24 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to open or non-metallic tel/comm pathways	3 in	6 in	12 in
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit tel/comm pathway.	3 in	6 in	12 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit tel/comm pathway.	1/2 the trade Size of the larger conduit	3 in	6 in

X. When cables are supported on Panduit J-Pro cable Support System J-Hooks, Caddy brand “Cable-Cat” hangers or Engineer approved supports, 48" maximum spacing. With longer spans, the constant heating and cooling of the cable causes expansion and contraction, which over time may actually change the electrical characteristics of the conductors. The weight of the cable bundle on the hanger will cause crushing and deformation of the cables, requiring more frequent support. A maximum of 17 cables shall be supported in a single hanger on 48" centers, no exceptions.

Y. In no case will unsupported spans of greater than 48" be approved by the Engineer. For spans longer than 48", the Contractor shall provide cable tray, channel, ladder, conduit, wireway, messenger wire or other Engineer approved cable support.

Z. Open unsupported spans between cable trays, conduit sleeves and trays, etc. shall not exceed 10" horizontally, 24" vertically. Provide "drop-out" supports spillways, and radius controls for changes in elevation as required.

AA. Provide a pull string in all raceways, cable trays and conduits.

BB. Ancillary cable support devices shall not be attached to data/ telecommunications cable trays, channels, ladders, etc. (e.g. J-hooks to the cable tray) without the expressed written approval of the Owner and Engineer. Cable support systems (e.g. trays, J-hooks) for other control systems (e.g. P.A., fire alarm, etc.) may share a common support structure (e.g. trapeze, hanger rod, etc.) provided required clearances are maintained, working access is not obstructed, and with the written approval of the Owner and Engineer.

CC. Restore fire rating and smoke stoppage integrity where all wireways, raceways and cable trays pierce walls, floors and ceilings by sealing with approved means; refer to Firestopping Section 270106 and other applicable sections of Divisions 26 and 27 Common Materials and Methods sections.

DD. Conduits runs shall have a maximum of two 90° bends.

EE. Conduit buried in concrete slab pours shall be full weight rigid galvanized steel or Carlon Schedule 40 PVC. All elbows, stub ups and conduit above ground shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations using "Carlon Solvent Weld Cement" to insure all joints are watertight.

FF. Conduit buried in or beneath building slabs or exterior below grade shall be full weight rigid galvanized steel or Carlon Schedule 40 PVC. The conduit will be encased in 3" concrete envelope or as called for on the Plan Drawings. All elbows and stub ups shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations using "Carlon Solvent Weld Cement" to insure all joints are watertight.

GG. Conduits and cables entering from outside the building shall be sealed water and moisture tight. Seal between conduit and sleeves, conduits and core drilled holes and around conductors inside conduits. Provide cast iron pipe or Schedule 40 galvanized steel conduit sleeves in exterior walls below grade, with intermediate wall stop and anchor collar set in place before concrete pouring. Sleeve shall be a part of the sealing assembly. When the wall opening is core drilled, the wall sleeve may be omitted. A mechanically compressed rubber sealing assembly equal to Thunderline Corp. "Link-Seal" shall be placed in the annular space between conduit and sleeve or core drilling.

HH. Provide continuous conduits across unexposed areas or areas of inaccessible ceilings.

II. A polyethylene pull string shall be installed in all communications conduits and a pull string will remain in all conduits when the cables under this contract are installed.

JJ. Layout the conduit system to avoid crossing building expansion joints. Where crossings are necessary, use expansion joints.

KK. Do not install wall mounted flush boxes back-to-back in opposite sides of a wall, in stud walls, boxes shall be on opposite sides of studs.

LL. On campus excavation:

1. Trenching, digging and other types of excavation on OWNER property requires a "OWNER Dig Permit." Technology Resources must originate "OWNER Dig Permits." Care should be taken by the contractor/installer to include landscaping restoration when bidding jobs.

MM. Off campus excavation:

1. It is the responsibility of the contractor/installer to obtain all city permits and utility marking prior to the beginning of each project. Care should be taken by the contractor/installer to include landscaping restoration when bidding jobs.

END OF SECTION 27 05 28

SECTION 27 05 29

PATHWAYS FOR AV SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduits

B. Pull Boxes

C. Conduit Fittings

D. Floor Boxes

1.2 DESCRIPTION OF WORK

A. Furnish and install all items listed in 1.1 required to support the AV systems cabling as indicated on the AV drawings, specified, or as otherwise required.

PART 2 - PRODUCTS

A. Refer to AV Drawings for pathway type required for each cable run. Substitution of pathway type requires Consultant's approval. Pathways shown without cable fill are for temporary or future cable use.

2.2 CONDUITS

A. General

1. Provide Pull String in all conduits for AV system.
2. The sizes of conduits shall be as shown on the drawings, minimum size is 0.75". All conduits shall be reamed and furnished with insulation and/or grounded bushings as required.

B. Flexible Steel Conduit

1. Flexible steel conduits are not acceptable for AV systems installations

C. Electrical Metallic Tubing (EMT)

1. EMT shall be zinc galvanized both inside and out with a minimum thickness of .0008". It shall be round with uniform wall thickness and continuously welded seams. EMT shall be furnished in ten-foot standard lengths.

D. PVC Conduit

1. PVC conduit shall be rigid non-metallic Schedule 40 heavy wall.
2. Use of PVC shall be limited to underground conduits only.

E. Conduits carrying fiber cables shall have large labels indicating "Fiber Optic Cable." These labels should be placed every 10 feet where exposed.

F. Buried conduits must have yellow "Caution Fiber Optic" tape laid 12 inches above duct bank.

2.3 PULL BOXES

A. Pull boxes shall be constructed of code gauge steel, etched, primed and shall have rust resistant ANSI 61 gray finish and be NEMA 1 construction with screw covers unless noted otherwise. For conduits 1-1/4" and larger terminating in a pull box, the minimum length of pull box shall be 8 times the diameter of the largest conduit terminating in the pull box. Splice boxes shall be sized as per EIA/TIA-569A Table 5.2-3.

B. Location and sizes of pull boxes and splice boxes shall meet the approval of the Architect and Consultant. Condulete type fittings (e.g. LB's, etc.) shall not be used in lieu of pull boxes or bends.

C. Exposed pull boxes in public areas shall be provided with tamperproof screws.

D. Boxes shall be free from unused openings, including knockouts.

E. Pull boxes larger than 12” x 12” for which a custom panel has not been specified, shall have hinged covers.

F. Gang, 4” square and 4-11/16” square boxes must be installed using open center brackets

G. Pull boxes for indoor wet or damp locations shall be NEMA 3R Rated with stainless steel screws.

H. Pull boxes for outdoor locations shall be NEMA 4X Rated stainless steel continuous hinges, door clamps and a hasp.

I. Provide junction box, pull box, and hand-hole assemblies sized as required by the NEC. Pull boxes/hand-holes shall be located using the following table:
   1. Runs with total of all bends <90 degrees – 600ft.
   2. Runs with total of all bends >=90 degrees and <180 degrees – 400ft.
   3. Runs with total of all bends >= 180 degrees and <270 degrees – 200ft.
   4. Runs with total of all bends >= 270 degrees are not allowed.

2.4 CONDUIT FITTINGS

A. All rigid, IMC and EMT fittings shall be galvanized malleable iron or steel. Connectors and couplings shall be threaded, setscrew, compression type, and concrete-tight.

B. Conduit bodies shall be malleable iron, threaded type. Provide neoprene cover gaskets for conduit body covers exposed to the weather.

C. Expansion fittings shall be O-Z/Gedney Type "AX" for rigid metal conduit and Type "TX" for electrical metallic tubing. For intermediate metal conduit applications, a 15-inch minimum length of rigid metal conduit shall be used with a Type "AX" expansion fitting. Provide O-Z/Gedney Type "BJ" bonding jumpers at all expansion fittings.

D. Rigid and IMC conduit bushings shall be of the insulated type with phenolic thermosetting insulation molded to a hot dipped galvanized malleable iron body of the threaded type.

E. EMT fittings shall be of the insulated throat type. Fittings larger than 2-1/2 inches shall have threaded bushings installed.

F. PVC conduit fittings shall be slip joint type.

G. All conduit sleeves will be fitted with “spillways” to maintain the bend radius of cables passing through the sleeve.

2.5 FLOOR BOXES

A. Refer to AV drawings for manufacturer, model, quantity, and location information.

B. Contractor to provide all parts and accessories required for a working floor box system including those required based on specific installation conditions unless otherwise noted.

C. Boxes to have a voltage divider to allow for power receptacles and low-voltage AV connections to reside within the same box. Conduits for high and low voltages must enter box on appropriate side of voltage divider to maintain separation. High and low-voltage wires may not cross within the box.

D. On-grade boxes to be cast-iron, and above grade, in-slab boxes to be steel.

E. Boxes to be fully adjustable, before and after the concrete pour.

F. Boxes shall have applicable approvals from a Nationally Recognized Testing Laboratory and meet all applicable local codes.

G. Floor Boxes on elevated floors must maintain proper fire rating of slab.

H. Provide equipment ground conductor as required by local code.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Whenever possible, cable and raceway routing paths shall follow the logical structure of the building (e.g. follow hallways, aisles and corridors). Route all AV cables and raceways parallel to or perpendicular to the building structure. No diagonal runs will be permitted unless noted otherwise or pre-approved by the Architect and Consultant. Corridor crossovers shall be kept to a minimum.
2. Coordinate layout of conduits including specific routing and mounting elevations with building structure and work of other trades.
3. Provide a pull string in all raceways, cable trays and conduits.
4. Transitions between cable trays and conduit, etc. shall not exceed 10” horizontally, 24” vertically. Provide “drop-out” supports spillways, and radius controls for changes in elevation as required.
5. All power devices and power sources emit a given amount of radio frequency interference (RFI) and/or electro-magnetic interference (EMI). To reduce or eliminate the field effects of RFI/EMI on the signals residing on a given cable, runs shall be kept at the maximum possible distance from such sources. Running cables through the center of the building can reduce the external interference effects of RFI/EMI in the cable tray. Open wiring and non-metallic raceway shall be routed a minimum of twelve (12") inches away from fluorescent fixtures. Special attention shall be given to the routing of such pathways away from lighting ballasts and high intensity discharge devices. Reference AV0.00 for the required separation distances of signals of different types.

B. Conduits

1. Provide continuous conduits across unexposed areas or areas of inaccessible ceilings.
2. Conduits attached to cable trays shall be secured with approved conduit clamps.
3. Conduit buried in concrete slab pours shall be full weight rigid galvanized steel or Schedule 40 PVC. All elbows, stub ups and conduit above ground shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations to ensure all joints are watertight.
4. Conduit buried in or beneath building slabs or exterior below grade shall be full weight rigid galvanized steel or Schedule 40 PVC. The conduit shall be encased in 3" concrete envelope or as called for on the Plan Drawings. All elbows and stub ups shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations to ensure all joints are watertight.
5. Conduits and cables entering from outside the building shall be sealed water and moisture tight. Seal between conduit and sleeves, conduits and core drilled holes and around conductors inside conduits. Provide cast iron pipe or Schedule 40 galvanized steel conduit sleeves in exterior walls below grade, with intermediate wall stop and anchor collar set in place before concrete pouring. Sleeve shall be a part of the sealing assembly. When the wall opening is core drilled, the wall sleeve may be omitted. A mechanically compressed rubber sealing assembly shall be placed in the annular space between conduit and the sleeve or the core drilling.
6. Conduits stubbed out into accessible ceiling to be located no more than 2’-6” above finished ceiling.

7. All conduits in accessible drop tile ceilings to remain accessible by ladders from the finished floor below.
8. Provide conduits over non-accessible ceilings as required.
9. Provide conduits from cable trays to accessible ceilings as required.
10. Layout the conduit system to avoid crossing building expansion joints. Where crossings are necessary, use expansion joints.

C. Boxes
1. Wall or ceiling boxes must be mounted flush with finished surface.
2. Final mounting height of all boxes on finished surfaces to be coordinated with Architect for alignment with adjacent boxes.
3. In stud walls, boxes on opposite sides of the wall must be separated by a minimum of 1 stud cavity.
4. In CMU or concrete walls, boxes on opposite sides of the wall must be separated by a minimum of 16".
5. Pull boxes shall be placed in straight sections of conduit runs and may not be used in lieu of a bend without approval of the Consultant. Pull boxes and/or splice boxes shall be installed in readily accessible locations. Where boxes are installed above suspended ceilings, they shall be located immediately above the suspended ceiling or the ceiling shall have a suitably marked and hinged panel to facilitate direct access to the pull box.
6. Boxes in accessible ceiling to be located no more than 2'-6" above finished ceiling.
7. All boxes mounted in accessible drop tile ceilings to remain accessible by ladders from the finished floor below.

D. Fire Stopping
1. Where pathways pierce walls, floors and/or ceilings, restore fire rating and smoke stoppage integrity as required by code.

E. Excavation:
1. It is the responsibility of the Contractor to obtain all permits and utility marking. Bids shall include landscaping restoration costs.

END OF SECTION 27 05 29

SECTION 27 13 00

COMMUNICATION SYSTEMS BACKBONE CABLING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and install copper backbone cabling as indicated on the Drawings, Specified or otherwise required.

B. Furnish and install fiber optic backbone cabling as indicated on the Drawings, specified or as otherwise required.

C. Furnish and install a complete entrance protection system, including surge protection equipment and surge protection modules as indicated on the drawings, specified or as otherwise required.

1.2 CONTRACTOR QUALIFICATIONS

A. All installers must be manufacturer certified technicians. Fiber installers must be certified. They must be properly trained to the manufacturers' specifications and able to provide documented proof of certification.

1.3 WARRANTY

A. All cable installations must be guaranteed for one year, including workmanship and materials. The one-year warranty will take effect once all documentation has been turned over and final walk-through has been performed. OWNER Voice/Video/Data personnel and installer will perform the final walk-through. Installer should follow the guidelines listed in this document. Failure to follow standards in this document will require the installer to fix/replace at his/her expense.

1.4 DOCUMENTATION PROCESS

A. Installer will provide Owner with two (2) complete sets of documentation upon completion of a cable project. Documentation should be provided in electronic and printed formats. For examples see appendix B.

B. Documentation will include:

C. AutoCAD drawings showing IDF, MDF, workstation locations with appropriate labeling.

1. Reports from cable testing equipment will be accepted for data and voice. Riser and station cable testing should be included. Acceptable tests performed with a Microtest Penta scanner, Fluke Meter or other industry accepted testing equipment.
2. Reports from industry accepted OTDR equipment will be accepted for fiber.
3. CATV cable must be tested using a Wavetek Signal Analysis Meter.
4. Graphed documentation should be provided when possible.
5. Spreadsheets may be used to express test results.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Material substitutions must be submitted in writing and contain manufacturer specifications. The design consultant must give written permission for product substitution.

2.2 COPPER CABLE

A. Inside plant (ISP) copper backbone cabling for voice/phone distribution shall be 24 AWG solid copper conductor twisted pair, CM, CMR or CMP rated (depending upon the application) and comply with the TIA/EIA-568-B2 Specification for multi-pair category 5 cable.

B. Multi pair cables shall be constructed of 25 pair binder groups and shall be 100 OHM unshielded twisted pair (UTP). Cables shall be color coded as per the PIC band strip color coding convention standard which uses 10 colors to identify 25 pairs. Cables larger than 25 pairs shall be sub-divided into sub-units of 25 pair binder groups, with each 25 pair sub-unit identified by color coded binder tapes.

C. The multi-pair cables (thru 100 pairs) shall be independently verified category 5 by E.T.L. or U.L. All shop drawing submittals shall indicate the cable verification.

D. Acceptable ISP copper backbone cables shall be of two (2) types as follows:
   1. Riser Cable shall be Superior Essex 51 series, riser rated. Pair count as noted on the Drawings.
      a. The cable shall consist of a core structure consisting of solid copper conductors insulated with polyethylene covered by a PVC skin coat. The core structure to be covered by a polypropylene film and overlaid with a corrugated aluminum shield, which is adhesively bonded to the outer jacket of PVC plastic to form an ALVYN sheath. The cable shall be "CMR" riser rated.

E. Outside Plant (OSP) cable to be gel filled, externally rated, and have proper lightning protection. Acceptable product shall be Superior Essex Megapic 04 series. Pair count shall be as indicated on the drawings.

F. Backbone copper cabling shall be terminated to 110 style terminal blocks, wall mounted to each equipment room.

2.3 FIBER CABLE

A. Provide fiber type and strand count indicated on drawings and risers. Fiber to be OFNR, OFNP, indoor, outdoor or OSP rated (depending on the application and complies with TIA/EIA-568-B3 specifications.

B. All fiber optic cable shall be armored or must be installed in 1" inner duct 9 (when not installed in conduit). Inner-duct should be orange in color.

C. Provide Indoor riser or plenum rated cable for all in-building, above grade cable.

D. Provide Indoor/outdoor riser or plenum rated cable for all in-building, below grade cable.

E. Provide OSP rated cable for all between building, below grade cable. OSP fiber must have armor cladding, gel filling, externally rating, and have proper lighting protection.

F. Multi-mode fiber shall be OM3 (50/125 micron, laser optimized) fiber optimized for operation at 850 and 1300 nm.
   1. Indoor Riser Rated Armored Fiber
      a. Belden F13DxxxF9 (xxx = fiber strand count)
      b. Or approved equal.
   2. Indoor Plenum Rated Armored Fiber
      a. Belden F13DxxxA9 (xxx = fiber strand count)
      b. Belden F13DxxxAK (xxx = fiber strand count)
      c. Or approved equal.
   3. Indoor / Outdoor Riser Rated Armored Fiber
      a. Belden FD3DxxxF9 (xxx = fiber strand count)
      b. Or approved equal.
   4. Indoor / Outdoor Plenum Rated Armored Fiber
      a. Belden FD3DxxxA9 (xxx = fiber strand count)
      b. Belden FD3DxxxAK (xxx = fiber strand count)
      c. Or approved equal.
   5. Outside Plant, Double Jacket, Armored Loose Tube Fiber
      a. Belden FS3Hxxx6G (xxx = fiber strand count)
      b. Or approved equal.

G. Single mode fiber shall be OS2 (9/125 micron) fiber optimized for operation at 1310 and 1550 nm.
   1. Indoor Riser Rated Armored Fiber
      a. Belden F1SDxxxF9 (xxx = fiber strand count)
      b. Or approved equal.
   2. Indoor Plenum Rated Armored Fiber
      a. Belden F1SDxxxA9 (xxx = fiber strand count)
      b. Belden F1SDxxxAK (xxx = fiber strand count)
      c. Or approved equal.
   3. Indoor / Outdoor Riser Rated Armored Fiber
      a. Belden FDSDxxxF9 (xxx = fiber strand count)
      b. Or approved equal.
   4. Indoor / Outdoor Plenum Rated Armored Fiber
      a. Belden FDSDxxxA9 (xxx = fiber strand count)
      b. Belden FDSDxxxAK (xxx = fiber strand count)
      c. Or approved equal.
   5. Outside Plant, Double Jacket, Armored Loose Tube Fiber
      a. Belden FSSHxxx6G (xxx = fiber strand count)
      b. Or approved equal.

H. A dual coating applied over the glass cladding shall protect the fiber and enhance long-term reliability. Each fiber shall be proof-tested to 100 kpsi.

2.4 FIBER PATCH PANELS

A. Provide rack mounted and wall mounted fiber enclosures as indicated on data riser and drawings to terminate all new fiber within the MDF and IDF rooms.

B. Fiber Enclosure:
   1. Size fiber enclosures for currently specified fiber in each equipment room plus an additional 25% for future fiber.
   2. Rack Mounted:
      a. Belden AX105564 – 2RU
      b. Belden AX105565 – 4RU
      c. Or approved Equal – Size as required per equipment room
   3. Wall Mounted:
      a. Belden AX103928
      b. Or approved equal.

C. Fiber Patch and Splice Cassettes
   1. Single Mode
      a. Belden FCSH12LDFS
      b. Or approved equal.
   2. Multi-Mode
      a. Belden FC3H12LDFS
      b. Or approved equal.

D. All fiber enclosures must be labeled with a label maker using black lettering.

2.5 ENTRANCE PROTECTION EQUIPMENT

A. Building entrance protection equipment for high pair count copper backbone cable shall be the Systimax #489ACAI-100; 100-pair protector panel with 110-connector block input.

B. Building entrance protection equipment for 50 pair count copper backbone cable shall be the Systimax #489ACAI-050; 50-pair protector panel with 110-connector block input.

C. Building entrance protection equipment for low pair count feeder cables shall be the Systimax #110ANAI-25; 25-pair protector panel with 110-connector block input and output.

D. Building entrance protection equipment for low pair count analog Voice cables, (exterior emergency phones and other applications) shall be the Systimax #110ANAI-06; 6-pair protector panel with 110-connector block input and output.

E. The protector module for use in all building entrance protection panels shall be the Systimax #3C1S solid-state protector module without heat-coils for sneak current protection. A protector module shall be provided in each available pair space in the panel.

F. Building entrance protection equipment for a single CAT5e or CAT6 cable (used for data) entering the building, and used with any cable serving a metering device or irrigation system control will be a Systimax Category 6 Protector. For data use Systimax CAT 6 16V, #760-028-373. For data w/POE use Systimax CAT 6 16V w/POE, #760-03-3951.

2.6 MDF AND TR ROOM EQUIPMENT RACKS

A. Provide equipment rack in MDF and TR Rooms as indicated on the drawings.

B. All floor standing equipment racks to be secured to floor with anchor bolts and to ladder tray at top of rack.

C. Provide seismic rated racks where required by local building code.

D. 2-Post Data Rack:
   1. Rack:
      a. Middle Atlantic RLA19-1245B
      b. Panduit R2P
      c. Or approved equal.
   2. Vertical cable organizers on the outside of each rack rows shall be 6” wide x 6” deep and 7’ in height with cable management on the front and back side, 1RMU high cable opening, locking hinged doors, color black.
      a. Panduit PR2VD06
      b. Or approved equal.
   3. Vertical cable organizers between racks in a row shall be 10” wide x 7” deep and 7 feet in height, with cable management on the front and back side, 1RMU high cable openings, locking hinged
      a. Panduit PR2VD10
      b. Or approved equal.
   4. Horizontal Cable Organizer – Provide 2RU cable managers. Provide a quantity equal to twice the number of 2RU patch panels provided in each equipment room, with a minimum of 3 per rack.
      a. Middle Atlantic HCM-2D
      b. Panduit WMP1E-2
      c. Or approved equal.

E. 4-Post Data Rack:
   1. Rack:
      a. Middle Atlantic R412-4524B
      b. Panduit R4P
      c. Or approved equal.
   2. Vertical cable organizers on the outside of each rack rows shall be 6” wide x 6” deep and 7’ in height with cable management on the front and back side, 1RMU high cable opening, locking hinged doors, color black.
      a. Panduit PR2VD06
      b. Or approved equal.

3. Vertical cable organizers between racks in a row shall be 10" wide x 7" deep and 7 feet in height, with cable management on the front and back side, 1RMU high cable openings, locking hinged
   a. Panduit PR2CD10
   b. Or approved equal.
4. Horizontal Cable Organizer – Provide 2RU cable managers. Provide a quantity equal to twice the number of 2RU patch panels provided in each equipment room, with a minimum of 3 per rack.
   a. Middle Atlantic HCM-2D
   b. Panduit WMP1E-2
   c. Or approved equal.

F. Enclosed Server Rack:
1. Rack:
   a. Middle Atlantic DRK1944-42
   b. Or approved equal.
2. Front Door – Provide vented, locking front door.
   a. Middle Atlantic DLVFD-44
   b. Or approved equal.
3. Side Panels – Racks within same equipment room are to be ganged together. Provide a single pair of side panels per equipment room.
   a. Middle Atlantic SPN-44-423
   b. Or approved equal.
4. Horizontal Cable Organizer – Provide 2RU cable managers. Provide a quantity equal to twice the number of 2RU patch panels provided in each equipment room, with a minimum of 3 per rack.
   a. Middle Atlantic HCM-2D
   b. Panduit WMP1E-2
   c. Or approved equal.

G. Wall Mounted Enclosed Data Rack:
1. Rack - Provide rack height as specified on drawings.
   a. Middle Atlantic CWR-xx-32PD (xx equal to specified height in RU).
   b. Or approved equal.
2. Horizontal Cable Organizer – Provide 2RU cable managers. Provide a quantity equal to twice the number of 2RU patch panels provided in each equipment room, with a minimum of 3 per rack.
   a. Middle Atlantic HCM-2D
   b. Panduit WMP1E-2
   c. Or approved equal.

2.7 MDF AND TR ROOM CABLE MANAGEMENT

A. Cable Ties and Wraps
1. Cable ties and wraps shall be of two (2) basic types:
   a. Hook and loop type (Velcro) cable wraps:
      1) ¾" wide roll stock material.
      2) Minimum 2" overlap.
      3) Available in plenum rating as required.
      4) Hook and loop cable wraps shall be utilized for cable management in the horizontal only, not to be used for the support of cables in the vertical or under load.
   b. Nylon and Halar cable ties:
      1) Parallel entry ties required, except plenum rating.

2) 0.190 width minimum.
3) Available plenum rating as required.
4) Nylon and/or Halar cable ties shall be utilized for cable management and support in the vertical and under load.
5) As manufactured by Panduit or Owner and Engineer approved equal.

2.8 PATCH CORDS

A. Patch Cords for equipment racks in MDFs, BDFs, or TRs rooms will be Cat-6 patch cords
B. For 80% of terminated single mode, duplex patch points in equipment rooms, provide one (1) Belden FPSLDLD002M – 2m dual LC to dual LC single mode patch cord or approved equal.
C. For 20% of terminated single mode, duplex patch points in equipment rooms, provide one (1) Belden FPSLDLD003M – 3m dual LC to dual LC single mode patch cord or approved equal.
D. For 80% of terminated multi-mode, duplex patch points in equipment rooms, provide one (1) Belden FP3LDLD002M – 2m dual LC to dual LC multi-mode patch cord or approved equal.
E. For 20% of terminated multi-mode, duplex patch points in equipment rooms, provide one (1) Belden FP3LDLD003M – 3m dual LC to dual LC multi-mode patch cord or approved equal
F. Provide one (1) 1000’ spool of 2-conductor, Cat3 cross-connect wire per 150 terminated cross connects. A minimum of one 1000’ spool will be provided.

PART 3 - EXECUTION

3.1 INSTALLATION

A. “ARMM” cable shall be utilized between MDF, BDF, TR Rooms and cabinets functioning as a TR.
B. 1010/2010 cable shall be utilized within the Telecommunication Rooms only.
C. All Riser Cable will be routed end to end through conduit when existing the Communication Rooms or cabinets.
D. All ISP copper backbone cables shall be installed as single continuous runs from cross-connect field to cross-connect field. No in-line connectors or splices etc. will be permitted.
E. All ISP copper backbone cabling shall be free of bridges, splices, taps, splitters and other connections between cross-connect fields.
F. The Contractor shall purchase the cable on reels only. Boxed or coiled cable is unacceptable.
G. All cable shall be new cable, manufactured as specified on the Drawings, purchase for the project. Salvaged, remnant or reused cable is not acceptable.
H. All unacceptable cable shall be removed immediately from the job site at the contractor’s expense.
I. All installed unapproved and/or unacceptable cable will be removed and replaced at the Contractors expense.
J. The Contractor shall install multi-pair telephone riser cables as per AT&T Standard Practices #627-610-225.

K. Cabling Contractor shall take care to assure that during the installation and upon completion, all cables have been installed free from kinks, twists, knots, sharp bends, gouges or cuts to the cable jacket or conductor insulation, or any other physical damage. During installation, the Contractor shall not allow the cables to lay on the floor and be exposed to foot, vehicle or equipment traffic, or be exposed to any other forms of abuse which may pinch, crush, bind, over tension, or in any way cause any physical damage to the data/communication cables. Such physical damage to the data/communication cables may cause electrical characteristic alterations to the cables, which may or may not be detected by standard testing procedures, cables exhibiting such physical damage or an attempt by the Contractor to correct, cover-up, hide or otherwise conceal such damage will be replaced at the Contractor's expense.

L. ISP copper backbone and tie cables routed from cable tray, cable ladder, conduit stubs and sleeves on to a distribution frame or telephone backboard shall be neatly organized and supported by cast aluminum "D" rings as required to minimize tension or stress on the cross-connect block terminations.

M. The Cabling Contractor shall observe all minimum bend radius and tension limitations, etc. as specified by the cable manufacturer and the TIA/EIA standards when installing the cable.

N. ISP copper backbone and tie cables shall be arranged and termination on the cross-connect fields in alphanumeric order by cable pair per PIC color code, starting from the left side of the cross-connect field.

O. All ISP copper backbone and tie cables shall enter the wall mounted cross connect field from the bottom right.

P. All ISP copper backbone cables shall be provided with a minimum 20 foot service loop at each end. Manage the service loop by means of cable routing around the room on the cable ladder. The cable slack shall be provided to accommodate future moves, adds and changes, cross-connect field service and possible future requirements to "float" the field.

Q. All cable must have a minimum of 2-foot service loop at each termination point.

3.2 ENTRANCE PROTECTION

A. Building entrance protection equipment shall be located in the BDF Room as indicated on the prints.

B. As per the National Electrical Code (NEC), the maximum exposure of non-rated (OSP) outside plant cables shall be limited to less than 50 feet in cable length and shall be limited to the BDF (e.g. must not pass between room or spaces).

C. All outside plant (OSP) cable will be routed in IMC or RGS metallic conduit from the exterior of the building to the BDF/MDF room.

D. The Telecommunications Main Grounding Bus Bar (TMGB) shall be located adjacent to the building entrance protection, 24 inches A.F.F. See Section 270526 for requirements.

E. Systimax 489 protector panels shall be stacked a maximum of three (3) units high, with the top of the top unit 62 inches A.F.F. nominal, unless otherwise approved by the Owner and Engineer.

F. Grounding bus bars of stacked 489 protector panels may be "daisy-chain" bonded together utilizing a #6 AWG bonding conductor to the TMGB.

G. In installations with large building entrance protection fields, creating excessive distances to the TMGB, a supplemental TGB shall be provided with a #2 AWG bonding conductor back to the TMGB.

H. Minimum building entrance protection panel grounding bonding conductor size shall be #6 AWG.

I. Routing and mounting of OSP cables to Entrance Protection shall be done on metallic "D" rings.

J. All building entrance protectors will be labeled with the Cable number and the cable pair numbers terminated on the protector.

3.3 RESTORATION

A. Installer will be required to restore infrastructure when performing work that damages property. Restoration may include, but is not limited to, walls, and ceilings. Installers will be required to restore these items to original condition. Contractors should consult Physical Plant when restoring infrastructure. If these steps are not taken, the installer may be required to redo work at his/her expense.

B. On request, owner will mark underground and internal building cableways. It is the contractor's responsibility to contact Physical Plant/Technology Resources prior to performing any type of ground excavation or building construction. Contractors damaging cable will be required to restore it to original condition at their own expense (no exceptions). For example, cable splicing is an unacceptable repair. Replacing damaged cable is the only acceptable repair.

3.4 LABELLING

A. Refer to Owner cabling standards for labeling requirements.

3.5 TESTING

A. Voice, data, and fiber cabling must pass respective testing standards. Continuity testing alone will not be accepted. Certification must be performed by equipment listed below and must have approved documentation (see "documentation process" above). Installation guidelines of both owner and manufacturer must be followed. Cable that does not follow specifications in the documents will be considered faulty, even if it passes respective testing procedures.

B. Voice
   1. All voice cable must be tested for basic continuity and length. Additional testing shall be performed to verify compliance with Category 5 performance. Provide 100% testing of permanent links for insertion loss, return loss, NEXT, PSNEXT, and PSACRF.
   2. Acceptable tests will utilize Microtest Penta scanner and Fluke Cable Meter products.

C. Data
   1. All voice cable must be tested for basic continuity and length. Additional testing shall be performed to verify compliance with Category 6 performance. Provide 100% testing of permanent links for insertion loss, return loss, NEXT, PSNEXT, and PSACRF.
   2. Acceptable tests will utilize Microtest Penta scanner and Fluke Cable Meter products.

D. Fiber
   1. All permanent fiber links will be tested for the following:
      a. Basic continuity testing.
      b. End to end power meter test performed per TIA/EIA-455-53A.
      c. System loss measurements at 850 and 1300 nanometers for multimode and 1310 and 1550 nanometers for singlemode fibers.
   2. Test set-up and performance should be conducted in accordance with ANSI/TIA/EIA-526-7 revision 2 and/or ANSI/TIA/EIA-526-14 revision A standards, and to the manufacturer's application guides.
   3. Attenuation testing should be performed with a stable launch condition using two (2) meter jumpers to attached the test equipment to permanent fiber links. The light source should be left in place after calibration and the power meter moved to the far end to take measurements.

E. All testing measurements shall be recorded in the testing documentation.

END OF SECTION

SECTION 27 15 00

COMMUNICATION SYSTEMS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and install copper twisted pair horizontal cabling as indicated on the Drawings, specified or otherwise required.

1.2 SUBMITTALS

A. Contractor Submittals
   1. Cable Factory Master Reel Test Reports shall be provided within two (2) working days of the material arriving on the construction site.
   2. Concurrent with the submittals of the Master Reel Reports for the copper cable, the Contractor shall submit a Memo of Compliance and Acceptability for the Contractor performed "Copper Pre-Installation" tests for the cables as received.

1.3 CONTRACTOR QUALIFICATIONS

A. It is recommended that all installers be manufacturer-certified technicians. Fiber installers are recommended to be properly trained to the manufacturers' specifications and to provide documented proof of certification.

1.4 WARRANTY

A. All cable installations must be guaranteed for one year, including workmanship and materials. The one-year warranty will take effect once all documentation has been turned over and final walk-through has been performed. Owner Voice/Video/Data personnel and installer will perform the final walk-through. Installer should follow the guidelines listed in this document. Failure to follow standards in this document will require the installer to fix/replace at his/her expense.

1.5 DOCUMENTATION PROCESS

A. Installer will provide Owner with two (2) complete sets of documentation upon completion of a cable project. Documentation should be provided in electronic and printed formats. For examples see appendix B.

B. Documentation will include:
   1. AutoCAD drawings showing IDF, MDF, workstation locations with appropriate labeling.
   2. Reports from cable testing equipment will be accepted for data and voice. Riser and station cable testing should be included. Acceptable tests performed with a Microtest Penta scanner, Fluke Meter or other industry accepted testing equipment.
   3. Reports from industry accepted OTDR equipment will be accepted for fiber.
   4. Graphed documentation should be provided when possible.
   5. Spreadsheets may be used to express test results.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Material substitutions must be submitted in writing and contain manufacturer specifications. An agent of OWNER Technology Resources department must give written permission for product substitution.

2.2 COPPER DATA CABLING

A. Installer must be trained in the guidelines of the previously mentioned manufactures' products, and must follow strict CAT6 installation guidelines. All exterior Category 6 cable must be gel filled and externally rated with proper lightning protection

B. Copper horizontal cabling for voice/data distribution shall be 100 Ohm Impedance, 23 AWG solid copper conductor, four unshielded twisted pair (4UTP), CMR (riser) or CMP (plenum) rated (depending upon the application) and comply or exceed TIA/EIA-568-B2 specifications for Category-6 cable.

C. The copper horizontal 4UTP cable shall be independently verified Category-6 by E.T.L. or U.L. All shop drawing submittals shall indicate the cable verification.

D. The copper horizontal cable shall provide the following guaranteed channel performance margin over minimum Category-6 specifications:
   1. NEXT: 6.0 dB
   2. PSNEXT: 7.5 dB
   3. Insertion Loss: 5.0%
   4. ELFEXT 6.0 dB
   5. PSELFEXT: 8.0 dB
   6. Return Loss: 4.0 dB
   7. Frequency Range: 1 to 250 MHz
   8. Typical margin represents worst pair minimum average.

E. The copper horizontal cables as follows:
   1. Belden 2400 CAT6 Horizontal data cable:
      a. Provide plenum or riser rated cable as required.
      b. Belden 2412 – Blue Jacket, CMR
      c. Belden 2413 – Blue Jacket, CMP
   2. Or Approved Equal.

F. Printed on the outer jacket shall be the manufacturer's identification and required E.T.L./U.L. markings, cable type, length markings, etc. Cable markings shall be in a clearly defined contrast to the jacket color.

2.3 COAX CABLING

A. Coaxial cabling shall be 2.2 GHz rated quad shield with manufacture recommended compression style "F" connectors. Provide CMR and CMP rated cable as required.

B. Provide RG-6 cable for horizontal runs under 200'. Provide RG-11 for horizontal runs over 200'.

C. Riser Rated Coax Cable:
   1. Belden 1322R – RG-6
   2. Or approved equal.

D. Plenum Rated Coax Cable:
   1. Belden 1189AP – RG-6
   2. Belden 1153A – RG-11
   3. Or approved equal.

2.4 FACEPLATES

A. Use Belden (or approved equal) patch panels, faceplates, and connectors on new installations. Installer should match the building standard on color and placement when installing faceplates.

B. Faceplates shall be designed for flush mounting of jacks, unless otherwise noted. Label fields shall allow for the identification of the location.

C. Faceplates for the standard 4-11/16" sq. box with single gang plaster ring shall be a two (2) port single gang plate, unless more is required. Faceplates will include ID Windows.

D. Part Numbers:
   1. Belden AX107022, AX103923, AX102655, or AX104161 - KeyConnect Faceplates, 2 Port
   2. Belden AX107023, AX102248, AX102249, or AX104163 - KeyConnect Faceplates, 4 Port
   3. Belden AX107024, AX102250, AX102251, or AX104164 - KeyConnect Faceplates, 6 Port
   4. Or approved equal.

E. Provide black cover inserts for empty jack opening in modular faceplates to match the faceplate color.

2.5 PATCH PANELS

A. Panels to be modular KeyConnect, standard density, Patch Panels. Provide 1RU and 2RU patch panels as required.

B. Provide 2RU of horizontal cable management below every patch panel. See 27 13 00.

C. Provide rear cable management bracket and bar. Provide label holder with computer printed LabelFlex label.

D. Part Numbers:
   1. Belden AX103114 – 24 Port, 1RU
   2. Belden AX103121 – 48 Port, 2RU
   3. Or approved equal.

2.6 MODULAR JACK

A. Modular jacks shall meet or exceed Category-6 requirements for EIA/TIA-568-B2-1, ISO/IEC-11801 and EN50173-1 and shall offer guaranteed margins over the minimum Category-6/Class E requirements when utilized with the specified horizontal copper cable.

B. Modular jacks to be Blue in color.

C. Provide modular jacks for faceplates and patch panels as required.

D. Part Numbers:
   1. Belden RV6MJKUBL – Blue REVConnect Jacks for Data
   2. Or approved equal.

2.7 PATCH CORDS

A. Patch Cords for equipment and workstation locations to be CAT6+ modular cords.

B. For 80% of terminated modular jacks in equipment rooms, provide one (1) Belden C601106007 – 7’ Cat6+ Patch Cord or approved equal.

C. For 40% of terminated modular jack in equipment rooms, provide one (1) Belden C601106015 – 15’ Cat6+ Patch Cord, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The cable manufacturer shall submit with each cable shipment, certified copies of the manufacturing master reel test reports indicating the worst case minimum electrical performance for each pair of each cable reel for all Category-6 cable. All master reel test reports shall indicate full compliance with all EIA/TIA-568-B1, -B1 Addendum 1, -B1 Addendum 2, -B1 Addendum 3, -B1 Addendum 4, -B1 Addendum 5, -B2, -B2 Addendum 1, -B2 Addendum 2, -B2 Addendum 3, -B2 Addendum 4, -B2 Addendum 5, -B2 Addendum 6, -B3 –B3 Addendum 1, specifications for Category–[5e] or [6],. Reports shall be obtained by the Contractor and submitted to the Owner and Engineer for review prior to installation and inclusion in the final record submittal documentation.

B. All four (4) pairs of conductors shall be insulated with a common FEP or PVC material, thus assuring stable performance characteristics, a common nominal value of propagation for all four (4) pairs and a resulting minimum skew. It shall be the responsibility of the Vendor/Contractor to assure that the cable submitted shall meet the minimum installed channel performance specifications as noted elsewhere, herein.

C. The maximum length for horizontal voice and data cables shall be limited to 90 meters (297 ft.) from user telecommunication outlet faceplate to the TR Room wall.

D. The Contractor shall purchase the cable on 1000-foot minimum reels only. Boxed and/or coiled cable is unacceptable. All cable shall be new cable, manufactured as specified on the Drawings, purchased for the project. Salvaged, remnant, or reused cable is not acceptable. Factory seconds and/or factory shorts are not acceptable. All unacceptable cable shall be removed immediately from the jobsite. All installed unapproved and/or unacceptable cable will be removed and replaced at the Contractor's expense.

E. Cabling Contractor shall take care to assure that during the installation and upon completion, all cables have been installed free from kinks, twists, knots, sharp bends, gouges or cuts to the cable jacket or conductor insulation, or any other physical damage. During installation, the Contractor shall not allow the cables to lay on the floor and be exposed to foot, vehicle or equipment traffic, or be exposed to any other forms of abuse which may pinch, crush, bind, over tension, or in any way cause any physical damage to the data/ communication cables. Such physical damage to the data/ communication cables may cause electrical characteristic alterations to the cables, which may or may not be detected by standard testing procedures. Cables exhibiting such physical damage or an attempt by the Contractor to correct, cover-up, hide or otherwise conceal such damage will be replaced at the Contractor's expense.

F. It is absolutely imperative that extreme care be exercised when installing the Category-6 data cables, as any sharp bends, cable kinks, crushing, or other abuse will cause deformity of the cable, discontinuity of twisted pairs and their relationship to one another, which will adversely affect the high speed electrical performance of the cable. Category-6 data cables must be terminated in accordance with the EIA/TIA-568-B1, -B1 Addendum 1, -B1 Addendum 2, -B1 Addendum 3, -B1 Addendum 4, -B1 Addendum 5, -B2, -B2 Addendum 1, -B2 Addendum 2, -B2 Addendum 3, -B2 Addendum 4, -B2 Addendum 5, -B2 Addendum 6, -B3 –B3 Addendum 1, specifications for Category–[5e] or [6],. Category-6 standards and the most current industry practices. Since cable performance is adversely affected by wiring practices, it is important that the Contractor preserve wiring pair twist as close as possible to the point of termination. The amount of "un-twisting" of a pair as the result of termination to the connector hardware, shall be no greater than 0.38" (Cat-6). To maintain the inter-relationship of pairs, the amount of "un-jacketing" of the cable shall be limited to 0.5 inches or less at the point of termination, unless noted otherwise.

G. Spare cable sets, cable sets for wireless access points, etc. shall be of sufficient length to reach any point within the intended service area, and shall be individually coiled at 200% of their recommended minimum radius or 16" diameter coil, whichever is larger. The coil shall then be “Velcro” cable wrapped and supported on "J-Hooks". The coil shall be located, if possible, above the workstation, individually tagged with the cable identification number.

H. The Cabling Contractor shall observe all minimum bend radius and tension limitations, etc. as specified by the cable manufacturer and/or the EIA/TIA standards when installing the cables. The maximum pulling tension for 4 pair 24 AWG horizontal UTP cables shall not exceed 25 ft./lbs. to avoid stretching the conductors during installation, however it should be noted that this tension is capable of causing jacket or other unacceptable damage. The minimum radius for Category-6 UTP cable shall be 1-1/2"R. When conflict exists between manufacturer’s specifications and this specification, the more stringent criteria shall apply.

I. Cables routed from cable trays, cable ladder, channel or other raceways onto the telephone backboard, onto a distribution frame or onto the equipment distribution racks shall be neatly organized and supported by cable support brackets, metallic distribution rings, cable clips, cable loops, or by other Engineer approved method as required to minimize tension or stress on the connector block terminations.

J. Cables should be laid in cable trays as opposed to being pulled through, if possible. Where cable must be pulled through cable tray, the Contractor shall station an installer at each turn and intersection in the cable tray to guide the cables around the corners and through the intersections. Cable pulls longer than 100 feet in length are not authorized by the Owner and Engineer. Pulls greater than 100 feet are made solely at the Contractor's risk. Cable shall be neatly coiled in a figure "8" pattern at the completion of a pull in preparation for the next pull.

K. Inside plant data/telecommunication cables shall not be stored or installed in an unheated building where the temperature is less than 40°F. The structure and the cable must be brought to a minimum 50°F. ambient for a minimum of 48 hours prior to installation of the cables. Failure to observe this precaution may result in damage to the cable and will result in the cable being replaced at the Contractor's expense.

L. Cable should never rest on ceiling grids or other mechanical/electrical systems.

M. All cable must have a minimum of 2-foot service loop at each termination point.

3.2 RESTORATION

A. Installer will be required to restore infrastructure when performing work that damages property. Restoration may include, but is not limited to, walls, and ceilings. Installers will be required to restore these items to original condition. Contractors should consult OWNER Physical Plant when restoring infrastructure. If these steps are not taken, the installer may be required to redo work at his/her expense.

B. On request, Owner will mark underground and internal building cableways. It is the contractor’s responsibility to contact Owner Physical Plant/Technology Resources prior to performing any type of ground excavation or building construction. Contractors damaging cable will be required to restore it to original condition at their own expense (no exceptions). For example, cable splicing is an unacceptable repair. Replacing damaged cable is the only acceptable repair.

3.3 LABELING

A. Refer to Owner cabling standards for labeling requirements.

3.4 TESTING

A. Data

1. All voice cable must be tested for basic continuity and length. Additional testing shall be performed to verify compliance with Category 6 performance. Provide 100% testing of permanent links for insertion loss, return loss, NEXT, PSNEXT, and PSACRF.
2. Acceptable tests will utilize Microtest Penta scanner and Fluke Cable Meter products.

END OF SECTION

SECTION 272100

DATA COMMUNICATIONS NETWORK EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. DT Series Drawings

C. Specification Sections:
   1. 27 05 26 Grounding and Bonding for Communications Systems
   2. 27 05 28 Pathways for Communication Systems
   3. 27 13 00 Communication Systems Backbone Cabling
   4. 27 15 00 Communication Systems Horizontal Cabling

1.2 REFERENCES

A. American National Safety Institute (A.N.S.I.).

B. National Electrical Code (N.E.C.).

C. National Fire Protection Association (N.F.P.A.).

D. Underwriters Laboratories (U.L.)

E. Telecommunications Industry Association (TIA)

F. International Telecommunications Union (I.T.U.-T.)

1.3 RESPONSIBILITY AND RELATED WORK

A. The Contract Documents are intended to include or imply all items required for the proper execution and completion of the work. Any item of work required by the Specifications or other portion of the Contract Documents but not shown on the drawings or shown on the drawings but not specifically required in the Specification will be identified prior to Bid Submittal.

B. The Contractor will provide minor accessories, such as connectors, adapters, matching devices and equipment items needed for a complete system, even if not specifically mentioned herein or on the drawings, without claim for additional payment.

C. System features or devices which are mentioned in one part of the Contract Documents may not be shown in the other. In case of conflict between the written specifications and the drawings, Contractor must seek clarification from the Consultant. If the Contractor fails to obtain such clarification, the interpretation of the Consultant will prevail.

D. Notwithstanding any detailed information in the Contract Documents, it is the responsibility of The Contractor to supply systems in full working order. Notify Consultant of any discrepancies in part numbers or quantities prior to bid submittal. Failing to provide such notification, The Contractor shall supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.

E. Obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

F. Contractor will comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the General Contractor.

G. If a conflict is identified between the contract documents and the appropriate codes and is reported to the General Contractor and confirmed prior to bid opening, Consultant will prepare the necessary clarification or revision. When a conflict is reported after contract award, the Contractor will propose a resolution of the conflict and, upon approval, perform related work.

H. The Contractor will coordinate with other Contractors as required and in a timely fashion to convey all information (scheduling, structural, electrical, technical or otherwise) necessary to the completed project.

1.4 DEFINITION OF TERMS AND ABBREVIATIONS

A. Provide: to supply and install.

B. Furnish: to supply to another contractor for installation.

C. Supply: to supply but not install.

D. Install: to install but not supply.

E. OFE: Owner furnished (supplied) equipment. Equipment will be provided to contractor for installation.

F. NIC: Not In Contract. Refers to items that are not included in the scope of work outlined in this section but may be shown for coordination purposes or reference.

G. Future: Equipment that will be provided by owner at a later date. Accommodations shall be provided for future equipment as shown on the drawings.

1.5 DESCRIPTION OF WORK

A. Furnish and install data networking equipment as specified in this section.

B. Software setup and configuration of equipment to be performed by Owner.

C. The Contractor shall furnish and install all materials and equipment to make a complete working system as indicated on associated Data Technology drawings and these specifications.

D. This specification shall include all labor, materials, equipment and services necessary for all data networking equipment. Work shall include, but not be limited to the following:

1. Facility Router/Security Appliance
2. Edge Switch(es)
3. Wireless Access Point(s)

1.6 WARRANTY

A. The Contractor shall warrant new equipment to be free of defects in materials and workmanship for not less than one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty will be rectified by replacement or repair. Within the warranty period, provide answer to service calls and requests for information within a 24-hour period, and repair or replace any faulty item within a 72-hour period without charge, including parts and labor. This warranty period does not extend to any existing equipment which is reused in the project.

B. This warranty will not void specific warranties issued by manufacturers for greater periods of time, or enhanced/extended warranties required for specific items in this specification. Nor will it void any rights guaranteed to the Owner by law.

C. Contractor to provide Owner with exact beginning and ending dates of the warranty period. Include the name of the person to call for service and telephone number. This information to be part of Project Record Set.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Material substitution requests must be submitted in writing and contain manufacturer specifications. An agent of Owner Technology Resources department must give written permission for product substitution.

2.2 FACILITY ROUTER/SECURITY APPLIANCE

A. Mount in IT rack.

B. Unit is to provide Cisco Advanced Malware Protection (AMP).
   1. Cisco Meraki MX250 (Qty. 1)
   2. Cisco Advanced Security License (1-year)
   3. Cisco 10G SFP+ Fiber Module (Qty. 1 – coordinate model with Owner)

2.3 EDGE SWITCH

A. Mount in IT rack.

B. Unit is to provide 740 watts of PoE (Max. 30 watts at any one port).
   1. Cisco MS350-48FP (Qty. 9)
   2. Cisco 1-year Advanced License
   3. Cisco 120G Stacking Cable – .5 meter (Qty. 8)
   4. Cisco 120G Stacking Cable – 1 meter (Qty. 2)

2.4 INTERIOR WIRELESS ACCESS POINT

A. Mount at locations indicated on drawings.

B. Provide mounting hardware as required.
   1. Cisco MR46E (Qty. 19)
   2. Cisco Advanced License (1-year)

2.5 EXTERIOR WIRELESS ACCESS POINT

A. Mount at locations indicated on drawings.

B. Provide mounting hardware as required.
   1. Cisco MR86 (Qty. 6)
   2. Cisco Advanced License (1-year)

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.

3.2 COORDINATION

A. Owner will provide software configuration and programming of network equipment. Coordinate with Owner's IT personnel for installation of equipment, switch locations in racks, and connection of stacking/linking cabling.

END OF SECTION

SECTION 27 30 00

FIRE ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general conditions, Division 1, and Basic Electrical Requirements (Section 26 05 00) are part of this section and the contract for this work and apply to this section as fully as if repeated herein.

B. Reference to other sections: The applicable requirements from other Division 26 sections required for a complete and operational system shall form a part of the electrical work and each section shall be thoroughly reviewed by the Contractor for application to all other sections.

1.2 DESCRIPTION

A. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled alarm system. It shall include, but not be limited to, alarm initiating devices, Alarm Control Panel (ACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

B. The alarm system shall comply with requirements of 2007 NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification.

1.3 SCOPE

A. A new intelligent reporting, microprocessor controlled detection system shall be installed in accordance to the project specifications and drawings. The system shall monitor the following: Manual alarm, waterflow alarm switches, valve supervisory tamper switches, post indicator valves, back-flow preventer supervisory switches, smoke detectors for elevator re-call, and door release, duct smoke detectors and/or area smoke detectors for fan stop and control of fire/smoke dampers, and heat detectors for elevator shut-down. The system shall include dry relay contacts for connection to a Digital Alarm Communicator Transmitter (DACT) for Central Station Monitoring.

B. Basic Performance

1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).
2. Initiation Device Circuits (IDC) shall be wired Class B (NFPA Style B) as part of an addressable device connected by the SLC Circuit.

1.4 BASIC SYSTEM FUNCTIONAL OPERATION

A. When an alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED on the ACP shall flash.
2. A local piezo electric signal in the control panel shall sound.
3. A backlit 80 character LCD display on the ACP shall indicate all information associated with the alarm condition, including the type of alarm point and its location within the protected premises.
4. History storage equipment shall log the information associated each new alarm control panel condition, along with time and date of occurrence.
5. All system output programs assigned via control-by-event programming corresponding to the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

1.5 SUBMITTALS

A. General:

1. Six copies of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is NOTIFIER and is intended to establish minimum standards of performance, function and quality.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Scaled (1/8” equals 1’ 0”) shall be provided.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, voltage drop calculations, battery back-up calculations, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout, configurations, and termination.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the alarm, supervisory, and trouble conditions.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 24 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system protection while modifications are being made.

E. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the installing contractor is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.6 GUARANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.7 QUALITY ASSURANCE AND STANDARDS

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

B. National Fire Protection Association (NFPA) - USA:

1.	No. 12	CO2 Extinguishing Systems (low and high)
2.	No. 12B	Halon 1211 Extinguishing Systems
3.	No. 13	Sprinkler Systems
4.	No. 13A	Halon 1301 Extinguishing Systems
5.	No. 15	Water Spray Systems
6.	No. 16	Foam/Water Deluge and Spray Systems
7.	No. 17	Dry Chemical Extinguishing Systems
8.	No. 17A	Wet Chemical Extinguishing Systems Clean Agent Extinguishing Systems
9.	No. 72-1993	National Fire Alarm Code
10.	No. 101	Life Safety Code

C. Underwriters Laboratories Inc. (UL) - USA:

1.	No. 268	Smoke Detectors for Protective Signaling Systems

2. No. 864 Control Units for Protective Signaling Systems
3. No. 268A Smoke Detectors for Duct Applications
4. No. 521 Heat Detectors for Protective Signaling Systems
5. No. 464 Audible Signaling Appliances
6. No. 38 Manually Actuated Signaling Boxes
7. No. 346 Waterflow Indicators for Protective Signaling Systems
8. No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
9. No. 1971 Visual Notification Appliances

D. California State Building Codes.

E. All requirements of the Local Dept.

1.8 APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

1. UL - Underwriters Laboratories Inc.
2. FM - Factory Mutual
3. CSFM - California State Fire Marshal

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model.

B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations.

2.2 CONDUIT AND WIRE

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. Conduit shall not enter the alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the ACP manufacturer.
3. Conduit shall be 3/4 inch minimum.

B. Wire:

1. All alarm system wiring shall be new.

2. Wiring shall be in accordance with local, state and national codes and as recommended by the manufacturer of the alarm system. Number and size of conductors shall be as recommended by the alarm system manufacturer, but not less than 18 AWG.
3. All wire and cable shall be listed and/or approved by a recognized testing agency.
4. All field wiring shall be electrically supervised for open circuit and ground fault.

C. Terminal Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their use and purpose.

2.3 MAIN ALARM CONTROL PANEL

A. The ACP shall be a NOTIFIER Model AFP-200 and shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system controlled devices.

B. System Capacity and General Operation:

1. The control panel shall provide, or be capable of expansion to 198 intelligent/addressable devices.
2. The control panel shall include Form-C alarm, trouble, supervisory, and security relays rated at a minimum of 3.0 amps at 30 VDC. It shall also include four Class B (NFPA Style Y) or Class A (NFPA Style Z) programmable Notification Appliance Circuits.
3. The alarm control panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the alarm system.
4. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the alarm control panel. The system shall be fully programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes.
5. The system shall allow the programming of any input to activate any output or group of outputs. Systems which have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or require a laptop personal computer are not considered suitable substitutes.

C. The ACP shall provide the following features:

1. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.
2. Detector sensitivity test, meeting requirements of NFPA 72, Chapter 7.
3. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
4. The ability to display or print system reports.
5. Periodic detector test, conducted automatically by the software.

D. Signaling Line Circuits (SLC)

1. The system shall include one SLC. The SLC interface shall provide power to and communicate with up to 99 intelligent detectors (ionization, photoelectric or thermal) and 99 intelligent modules (monitor or control) for a system capacity of 198 devices. The SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.
2. The Loop Interface Board (LIB) shall receive analog information from all intelligent detectors to be processed to determine whether normal, alarm, pre-alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
3. The detector software shall meet NFPA 72, Chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.
4. The detector software shall allow manual or automatic sensitivity adjustment.

E. Serial Interfaces

1. The system shall include two serial RS - 232 interfaces. Each interface shall be a means of connecting UL Listed Electronic Data Processing (EDP) peripherals.
2. The system shall include an RS – 485S port for the serial connection of optional annunciators and remote LCD displays.
3. The RS - 485 interface may be used for network connection to a proprietary receiving unit.

F. Notification Appliance Circuit (NAC) Module

1. The Notification Appliance Circuit module shall provide four fully supervised Class A or B (NFPA Style Z or Y) notification circuits.
2. The notification circuit capacity shall be 3.0 amperes maximum.

G. Control Relay Module

1. The control relay module shall provide eight Form-C auxiliary relay circuits rated at 5 amperes, 28 VDC.
2. Each relay circuit shall be capable of being activated (change in state) by any initiating device or from any combination of initiating devices.

H. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be selected for either right or left hand hinging.

I. Power Supplies:

1. The main power supply for the alarm control panel shall provide 3.0 amps of available power for the control panel and peripheral devices.
2. The main power supply shall continuously monitor all field wires for earth ground conditions.
3. The main power supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge.
4. A separate auxiliary power supply for door holders shall be provided. Loss of 120 VAC power to the auxiliary power supply shall release the door holders.
5. All circuits shall be power-limited, per 1995 UL864 requirements.

2.4 SYSTEM COMPONENTS

A. Waterflow Indicator:

1. Waterflow Switches shall be furnished by the Sprinkler Contractor.
2. Waterflow Switches shall be connected under this section but installed and adjusted by the sprinkler contractor.

B. Sprinkler and Valve Supervisory Switches

1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch.
2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
3. Valve supervisory switches shall be connected under this section and furnished, installed, and adjusted for proper operation by the sprinkler contractor.

C. Serially Connected Annunciator, NOTIFIER LCD-80

1. The annunciator shall communicate with the alarm control panel via a two wire RS – 485S (multi-drop) communications circuit.
2. The annunciator shall require no more than four wires for operation. Annunciation shall include: intelligent addressable points, system software zones, control relays, and notification appliance circuits. The following operations shall also be provided:

D. Door Holders

1. Door holders shall be furnished by the Hardware Contractor.
2. Door holders shall be connected and powered under this section but installed and adjusted by the hardware contractor.

2.5 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices – General

1. Addressable devices shall use simple to install and maintain decade (numbered 1 to 10) type address switches.
2. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.
3. The alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity shall be automatically adjusted by the panel on a time-of-day basis.
4. Using software in the ACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
5. The detectors shall include a separate twist-lock base with tamper proof feature.
6. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
7. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the ACP based on real-time measured values. The ACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the ACP program and allowing the system operator to view the current analog value of each detector.

B. Addressable Pull Box (manual station), NOTIFIER BGX-1O1L

1. The addressable pull box shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. The pull box shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, the pull box cannot be restored to normal use except by the use of a key.
2. The manual station shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word “Fire” shall appear on the front of the station in raised letters, 1.75 inches or larger.

C. Intelligent Photoelectric Smoke Detector, NOTIFIER SDX-751

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

D. Intelligent Heat Detector, NOTIFIER FDX-551R

1. The detectors shall be 135 degree F rate-of-rise heat detectors and shall, on command from the control panel, send data to the panel representing the analog level of heat.

E. Intelligent Duct Smoke Detector, NOTIFIER DHX-502/SDX-551

1. The smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the ACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and gases throughout the areas served by the duct system.

F. Addressable Dry Contact Monitor Module, NOTIFIER MMX-1

1. Addressable monitor modules shall be provided to connect each waterflow and tamper switch to the SLC.
2. The monitor module shall mount in a 4-inch square, 2-1/8 inch deep electrical box with 12 inch extension ring.
3. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

G. Addressable Control Module, NOTIFIER CMX-2

1. Addressable control modules shall be provided to supervise and control the operation of fan shutdown, fire/smoke damper control, door release, elevator re-call and elevator shut-down.
2. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box with 12 inch extension ring.
3. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relays may be energized at the same time on the same pair of wires.

2.6 AUDIBLE/VISUAL COMPONENTS

A. Horns: AS AUDIBLE STROBE APPLIANCES, SERIES AH AUDIBLE HORN APPLIANCE

1. The notification appliances shall be Wheelock’s Series AS Audible Strobe and Series AH Audible appliances; and when synchronization is required the companion Series SM and DSM Sync Module(s), or approved equals. Series AS appliances and Series SM and DSM Sync Module(s) shall be listed under UL Standard 1971 (Emergency Devices for the Hearing-Impaired for Indoor Fire Protection Service). Series AH Audible Series shall be UL listed under Standard 464 (Fire Protective Signaling). Series AS, AH, SM and DSM shall be certified to meet FCC part 15, Class B.

2. The appliances shall be designed for 2-wire operation and shall provide either a continuous or temporal (Code 3) tone when constant voltage from a Notification Appliance Circuit (NAC) of the Fire Alarm Control Panel (FACP) is applied or synchronized temporal (Code 3) tone and synchronized strobe when used in conjunction with the Series SM or DSM Sync Module(s).
3. Series AS shall be designed so that the audible signal may be silenced while maintaining strobe activation (when used with the Series SM or DSM Sync Module(s)). The Series SM and DSM Sync Module(s) shall incorporate two inputs from the Notification Appliance Circuits (NAC) for power connection from the Fire Alarm Control Panel; one for the strobe circuit (NAC) and one for the audible circuit (NAC). A single 2-wire output shall control both the audible and visual appliances. Upon activation of the audible silence function of the Fire Alarm Control Panel, the audible signal shall be silenced while maintaining strobe activation.
4. Sound output at 10 feet shall be field selectable for 90, 95, or 99 dBA anechoic for both continuous and temporal (Code 3) tones. Series AS shall provide listed strobe intensities of 15, 15/75, 30, 75, and 110 candela for wall mount and/or 15, 30, 75 and 100 candela for ceiling mount applications, with a flash rate of one flash per second minimum across the Listed voltage range. The strobe appliance shall incorporate a Xenon flashtube enclosed in a rugged Lexan lens. All appliances shall incorporate a zero inrush circuit design.
5. All versions shall be polarized for DC supervision and shall incorporate screw terminals for in/out field wiring of #18 to #12 AWG wire size.
6. Dimensions for the Series AS/AH shall be 4 and 5/8 inches square by 1 and ½ inches deep.

B. RSS Sync Strobes

1. The visual notification appliances shall be Wheelock Series RSS Strobe Appliances, or approved equals. Series RSS shall meet and be Listed under UL Standard 1971 (Emergency Devices for the Hearing Impaired for indoor protection service). The strobes shall be listed for indoor use only. All strobes shall be certified to meet FCC Part 15 Class B. All inputs shall be polarized for compatibility with standard reverse polarity supervision of circuit wiring by a Fire Control Panel (FACP).
2. All visual appliances shall incorporate a Xenon flashtube enclosed in a rugged Lexan lens. The Series RSS Strobes shall be the Low Current Design. The strobe intensity shall be rated per UL 1971 for 15, 15/75, 30, 75, and 110 candela for wall mount and 15, 30, 75, and 100 candela for ceiling mount applications for the Series RSS. Series RSS appliances shall incorporate circuitry for *synchronized strobe flash* and shall be designed for compatibility with Wheelock Series SM and DSM Sync Modules. The strobes shall not drift out of synchronization at any time during operation. If the sync module fails to operate (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate.
3. The visual appliances shall be designed for indoor surface or flush mounting.

4. For outdoor installations, the strobe appliance shall be the Wheelock WM3T. The WM3T shall meet and be listed under UL1638 (Private Mode Emergency and utility Signaling). "NOT TO BE USED AS AN INDOOR VISUAL EVACUATION SIGNAL OR FOR THE HEARING IMPAIRED." The WM3T shall be mounted to a weather resistant backbox: either the Wheelock WBB box or approved equal when mounted outdoors. The WM3T strobes shall produce a flash rate of one (1) flash per second minimum over the Listed Voltage range of 20-31 VDC for 24-volt models. The strobe intensity shall be rated at 117 candela.

2.7 BATTERIES

A. The batteries shall be sealed Gel Cell type, 12 volt nominal.

B. Upon a normal AC power failure the battery shall have sufficient capacity to power the alarm system for not less than twenty-four hours plus 5 minutes of alarm.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

D. Manual pull station shall be suitable for surface mounting or semiflush mounting as shown on the plans, and shall be installed 48 inches above the finished floor.

E. Smoke detector(s) at the top of the elevator hoistway(s) shall be mounted on a U.L. 10-B self closing and self locking access door(s). Access door(s) shall be provided and installed by other divisions of the specifications.

3.2 TEST

A. The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C. Close each sprinkler system flow valve and verify proper supervisory alarm at the ACP.

D. Verify activation of all waterflow switches.

E. Open initiating device circuits and verify that the trouble signal actuates.

F. Open and short signaling line circuits and verify that the trouble signal actuates.

G. Ground all circuits and verify response of trouble signals.

H. Check installation, supervision, and operation of all intelligent smoke and heat detectors.

I. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the ACP and the correct activation of the control points.

3.3 FINAL INSPECTION

A. At the final inspection, a factory trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect.

3.4 INSTRUCTION

A. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

END OF SECTION 273000

SECTION 27 41 34

AV SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. AV Drawings

B. Specification Section 27 05 29 Pathways for AV Systems.

1.2 GENERAL REQUIREMENTS

A. All requirements under Instructions to Bidders, General Conditions, Supplementary Conditions, Special Conditions, Division One, Technical Specifications, Referenced Documents or Practices and any Addenda of these Specifications will be a part of this section. The Contractor is responsible to be thoroughly familiar with all its contents as to requirements which affect this Division or Section.

1.3 REFERENCES

A. American National Safety Institute (A.N.S.I.).

B. National Electrical Code (N.E.C.).

C. National Fire Protection Association (N.F.P.A.).

D. Underwriters Laboratories (U.L.)

E. Telecommunications Industry Association (TIA)

F. National Cable Television Association (N.C.T.A.)

G. Society of Motion Picture and Television Engineers (S.M.P.T.E.)

H. International Telecommunications Union (I.T.U.-T.)

I. Sound System Engineering (2nd Edition), Davis and Davis, Howard W. Sams, 1987.

J. Audio System - Design and Installation, Giddings, Howard W. Sams, 1990.

1.4 RESPONSIBILITY AND RELATED WORK

A. The systems described in this section will be called the "AV Systems" and the installer will be named "The Contractor." The Contractor will provide all labor, materials, equipment, necessary tools, test equipment, hoisting, transportation, supervision and coordination necessary to complete the installation of the "AV Systems" as described in these specifications and illustrated on the Project drawings.

B. The Contract Documents are intended to include or imply all items required for the proper execution and completion of the work. Any item of work required by the Specifications or other portion of the Contract Documents but not shown on the drawings or shown on the drawings but not specifically required in the Specification will be identified prior to Bid Submittal.

C. The AV Systems consist of the materials, equipment and systems described in this specification, related drawing details, and any schedules that are part of the construction document set. This Contract is for equipment, material, installation and training. The work of this section includes a complete and operational turn-key system.

D. The Contractor will provide minor accessories, such as connectors, adapters, matching devices and equipment items needed for a complete system, even if not specifically mentioned herein or on the drawings, without claim for additional payment.

E. System features or devices which are mentioned in one part of the Contract Documents may not be shown in the other. In case of conflict between the written specifications and the drawings, Contractor must seek clarification from the Consultant. If the Contractor fails to obtain such clarification, the interpretation of the Consultant will prevail.

F. Notwithstanding any detailed information in the Contract Documents, it is the responsibility of The Contractor to supply systems in full working order. Notify Consultant of any discrepancies in part numbers or quantities prior to bid submittal. Failing to provide such notification, The Contractor shall supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.

G. Obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

H. Contractor will comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the General Contractor.

I. If a conflict is identified between the contract documents and the appropriate codes and is reported to the General Contractor and confirmed prior to bid opening, Consultant will prepare the necessary clarification or revision. When a conflict is reported after contract award, the Contractor will propose a resolution of the conflict and, upon approval, perform related work.

J. The Contractor will coordinate with other Contractors as required and in a timely fashion to convey all information (scheduling, structural, electrical, technical or otherwise) necessary to the completed project.

K. Refer to AV0.00 for division of responsibilities related to the sound reinforcement system.

L. The Contractor will be responsible for connecting ground point to all equipment in accordance with applicable national and local codes, standards specified. Coordinate with the Division 26 Electrical Contractor.

M. The Contractor will be responsible for loss calculations for the MATV distribution system and shall provide the number of amplifiers required to fulfill the performance standards of the design.

1.5 DEFINITION OF TERMS & ABBREVIATIONS:

A. Provide: to supply and install.

B. Furnish: to supply to another contractor for installation.

C. Supply: to supply but not install.

D. Install: to install but not supply.

E. OFE: Owner furnished (supplied) equipment. Equipment will be provided to contractor for installation.

F. NIC: Not In Contract. Refers to items that are not included in the scope of work outlined in this section but may be shown for coordination purposes or reference.

G. Future: Equipment that will be provided by owner later. Accommodations will be provided for future equipment as shown on the drawings.

1.6 SYSTEM DESCRIPTION

A. An integrated audio processing core will be installed in the main equipment room and will be audio distribution controller and control system processor for the entire facility. A dedicated AV network will be installed in the AV equipment racks and will provide control and audio transport throughout the facility.

B. The audio processing core will provided paging throughout the entire venue. IP based paging stations will be installed in the building and connect via structure cabling by data cabling contractor. The paging system will be controlled by a touchscreen at the front desk and IP paging stations.

C. Community Room 101
   1. A large LED screen will be wall mounted at the front of the room. The TV will be driven by a presentation switcher. Inputs to the display include HDMI inputs, wireless presentation, and a blu-ray player.
   2. Wall mounted cameras and ceiling mounted microphones will connect to the wireless presentation device to web conferencing on user's devices.
   3. Surface mounted speakers and in-walls subwoofers will provide surround sound for presentation and conferencing.
   4. Wall mounted touchscreen will control audio, video, and lighting in the room.

D. Seminar Room 119
   1. A large TV will be wall mounted at the front of the room. The TV will be driven by a presentation switcher. Inputs to the display include HDMI inputs and wireless presentation.
   2. Wall mounted camera and ceiling mounted microphones will connect to the wireless presentation device for web conferencing on user's devices.
   3. In-ceiling speakers will provide sound for presentation and web conferencing.
   4. Wall mounted touchscreen will control audio, video, and lighting in the room.

E. Conference Rooms
   1. A TV will be wall mounted at the front of the room. Inputs to the display include HDMI inputs in floorboxes or on the wall and wireless presentation. Wireless presentation will only be provided in medium and large conferencing rooms.
   2. TV speakers will provide audio for presentations.
   3. Wall mounted touchscreen will control the TVs in each room.

F. Digital Signage
   1. TVs will be wall mounted the entry lobby and teen area for digital signage.
   2. TVs will be driven and controlled by the digital signage platform. Digital signage software and licenses will be provided by the city. Contractor will install and configure digital signage hardware.

1.7 PRE-BID SUBMITTALS

A. Bid Clarifications. Contractor is responsible for reading and understanding all information presented in these specifications and related documents outlined in Section PART 1 - . Discrepancies between drawings and specifications or other errors or omissions should be brought to the Consultant's attention a minimum of 5 days prior to bid date. Failure to do so does not relieve the contractor from the requirement to provide a fully operational and turnkey system as outlined in Section 1.6. In this event, the Contractor agrees to abide by the decision of the Consultant for resolution.

B. Contractor Qualifications. The following contractors are pre-qualified for this project. Additional contractors will be considered by the Owner and Consultant upon receipt of qualifications as outlined in Bid Submittals section below.

Contractor Name Contact: Email: Phone: Address:	Contractor Name Contact: Email: Phone: Address:
Contractor Name Contact: Email: Phone: Address:	Contractor Name Contact: Email: Phone: Address:

1.8 BID SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Bidders that have not been pre-qualified shall submit the following information:
   1. Company profile including history, number of employees, facility size and completed projects.
   2. Installer shall have previously installed at least three jobs of similar magnitude, completed within the last five years. A resume will be provided for these projects including project name, scope of services, year completed, and contact information for a reference. Provide at least one such completed job for inspection by the Architect and/or consultant.
   3. Installer shall have experience with equipment and systems of the types specified, shall maintain a fully staffed and equipped service facility, and shall be a franchised dealer and authorized service facility for the major brands specified, and shall be properly licensed to work in the state the project resides in.
   4. Resume of key personnel to be used on this project, including but not limited to: Project Manager; Lead Engineer; Job-Site Superintendent.
   5. A sample set of shop drawings or as-built documents that confirm the Contractor's capabilities to provide engineering and documentation for the project.
   6. A line sheet listing all manufacturers the Contractor is a dealer and/or authorized service center for.
   7. A description of the Contractor's abilities for in-shop assembly, fabrication and testing.

C. The Bidder shall disclose in the bid whether any portions of the project work will be subcontracted out. All terms of this contract, including bidding and qualification statements, will apply to the subcontractor.
   1. Name of the proposed subcontractor.
   2. A statement of qualifications for each subcontractor.
   3. A scope of work outlining what portions of the project for which the subcontractor will be responsible.

D. Include the following information with the bid submittal:
   1. The total contract price.
   2. The total price for any add or deduct alternates.
   3. The price for contractor tests and adjustments as outlined in Section 3.6 Acceptance.
   4. An itemized equipment list.
   5. Unit pricing for all equipment listed above.
   6. A breakdown of the number of labor hours for each of the following:
      a. Engineering and documentation.
      b. On site coordination meetings and supervision.
      c. In shop fabrication and assembly.
      d. On site fabrication, assembly, and installation.
      e. On site verification and testing.

E. Substitutions. Contractor shall note all substitutions at the time of bid. Comply with General Conditions. Any proposed substitutions must meet all specifications of the specified equipment. No product substitution will be accepted without the written approval of the Consultant or Owner. Consultant and owner retain the right to reject any proposed substitution.

F. Contractor to obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

1.9 PROJECT SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Each submittal will be as a coordinated package complete with all required information. Uncoordinated sets will be returned without review.

C. Product Data: Submit within 30 days of contract award. Submit manufacturer's product data sheets for each item of equipment that will be provided as part of this contract. Submit electronically as a single PDF. All equipment cut sheets will be arranged per specification section number. Provide a table of contents and a bookmark at the start of every product sheet.

D. Cable and Connector Submittal. Submit sample cables with connections and wire labels. Cable samples should be no greater than 24" in length. Submit 2 cable/connector assemblies for each type of cable used on the project. Cable jacket ID lettering must be included on sample cable.

E. Submit heat load calculations showing how numbers were derived.

F. Speaker and Speaker Mount Colors. Submit according to conditions of the Construction Contract and Project Manual.

G. Millwork Colors and Samples. Submit according to conditions of the Construction Contract and Project Manual

H. Shop Drawings.
   1. Submit within 60 days of contract award
      a. Failure to submit shop drawings with ample time for evaluation shall not entitle the contractor to an extension of contract time.
      b. There will be no work authorized on site without the prior submittal and subsequent approval of a complete set of shop drawings. Any exceptions to this must be in writing and approved by the Consultant.
      c. Review of shop drawings is for general conformance with the design intent and general compliance with the contract documents of the project. Corrections, comments or markings made do not relieve the Contractor from compliance with the Contract Documents nor allow departure there from. Contractor remains responsible for detailing and accuracy, confirming and correlating quantities and dimensions, selecting fabrication processing and techniques of construction, coordinating work with that of other trades, and performing work in a safe a satisfactory manner.
   2. Submit as a multi-sheet searchable PDF document with:
      a. 42" X 30" sheets
      b. Table of Contents
      c. Bookmarks for every sheet with Sheet Name and Number
   3. Drawings will be a standalone package containing all information required for system installation. The package will include:
      a. A legend of all symbols and abbreviations used in the drawing package
      b. Plan View Drawings showing:
         1) Locations of all equipment and devices
         2) Locations of junction boxes, with associated conduits and cable fill
         3) Coordinated layouts of:
            a) Equipment Rooms
            b) Control Booths
            c) Production Suites
      c. Section and Elevation Drawings including but not limited to:
         1) Speakers
         2) Large Displays
         3) Projection Screens
         4) Projectors
      d. Equipment Rack Elevations including:
         1) Location of all equipment within the rack
         2) Heat loads for each equipment rack and calculations showing how numbers were derived
      e. Custom Furniture and Millwork Details

1) Show all dimensions and finishes for custom furniture and Millwork including equipment locations and mounting methods, coordinate with Division 6.

f. AC Power Requirements
   1) For each equipment rack show:
      a) Power requirements and calculations showing how numbers were derived
      b) Power distribution details within each rack

g. Speaker Orientation and Rigging Detail Drawings
   1) Details will be submitted with licensed engineer stamp licensed in the state in which the project resides.
   2) Drawings will include:
      a) Structural attachment details
      b) Welding calculations
      c) Types of hardware to be used
      d) Speaker aiming angles
   3) Provide structural calculations along with the stamped drawings. Refer to all requirements of Division 5 – Metals.

h. Wiring Schematics
   1) Complete and detailed wiring schematic for all systems including:
      a) Cable types
      b) Identification by number and color codes
      c) Detailed wiring of connections to equipment and between equipment racks

i. Schematic drawings of any custom circuitry or equipment modifications, including connector pin-outs and component lists.

j. Schedules showing:
   1) Cable Types
      a) Type Identifier matching Contract Documents
      b) Manufacturer
      c) Part Number
      d) Signal Group
      e) Nominal Outside Diameter
   2) Junction Boxes
      a) Box Name
      b) Drawing Reference
      c) Location
      d) Dimensions
      e) Mounting Height
   3) Pull Schedule
      a) Pull Length
      b) Source and Destination
      c) Wire Number
   4) Custom Color and Finishes for:
      a) Speakers
      b) Custom Panels
      c) Exposed Cabling
      d) Custom Furniture

k. Conduit riser diagram showing interconnect of all systems

l. Terminal strip layouts for all terminal strips to be used in junction boxes or equipment racks

m. Connector wiring details including connector model numbers

n. Network schematic showing:
   1) Logical Connections of all devices

2) IP address scheme
3) VLAN Scheme

o. Custom Panel Details including:
1) Materials
2) Finishes
3) Dimensions
4) Connector Layout
5) Connector Labeling

p. Audio, Video and Data patch bay layouts and labeling scheme

q. Mounting and orientation details for:
1) Flat Panel Displays
2) Surface Mount Speakers
3) Wireless antenna

I. Wireless frequency analysis. It is the responsibility of the contractor to coordinate all wireless frequencies. The contractor shall perform a spectral sweep from 140 MHz through 3 GHz in the facility and then present a written report of proposed new frequencies. The Contractor must arrange and perform this sweep at a time of day that reflects the time of facility use. The contractor should also include in the report additional frequencies for future expansion. The Contractor will incorporate any existing and other new frequencies in the determination of the new frequencies to be used, including but not limited to wireless intercom, wireless cameras and wireless radios.

J. Assistive Listening System Analysis. Contractor is responsible for providing documentation showing the Assistive Listen system meets accessibility requirements of the project location. Contractor is to provide a quantity of receivers per prevailing code.

1.10 CONTRACT CLOSEOUT SUBMITTALS

A. Submit according to conditions of the Construction Contract and Project Manual.

B. Submit all contract closeout documentation within 30 days after substantial completion, unless otherwise noted.

C. Contractor shall work off approved shop drawings only. Note changes made during installation on a single set of drawings. This set of marked up drawings will not leave the jobsite until after the final system commissioning. Submit 4 corrected sets of reproducible drawings showing work as installed. All “as-built” drawings to be provided both in electronic form (ACAD 2010 or later) and in hard copy (same size as architectural drawings).

D. Contractor to provide a Project Manual prior to acceptance testing. Provide a minimum of 1 hard copy and one electronic copy. This manual will contain the following information:
1. Table of Contents.
2. Contractor’s contact information for warranty and/or service.
3. A complete list of equipment, both installed and loose gear. Include manufacturer, model number, and serial number for all devices. Include settings (software or hardware) for any devices that required modification or adjustment during the acceptance testing.
4. Operating manuals for each device.
5. Documentation of all testing results as outlined in Section 3.6 Acceptance.
6. Wireless microphone frequency coordination report
7. A USB Drive containing all As-Built drawings in PDF & DWG format.
8. Replacement parts lists of major items of equipment.
9. Provide a suggested schedule of routine maintenance. Schedule should include dates of replacement of all batteries, cleaning of air filters and procedures for checking speaker components.
10. Create a quick start guide to provide information specific to the system, such as procedures for system power on/off, patching, different modes of operation etc.

a. The guide should convey information specific to the installed system. It is not intended to be a guide on generic sound system operation.
b. Anticipated length of the guide is less than 2 pages front and back.

E. Provide a copy of all software installed on computers or equipment in the system, including all device configuration files on a USB Disk.

F. Produce compact system flow diagrams showing all components, cables, and wire numbers that will be mounted on the wall of each equipment rooms(s). Provide photographically reproducible as-built wiring diagrams at a reduced scale that are easy to handle and fully legible.

G. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor will certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

H. Provide a complete list of spares inventory to include quantity, manufacturer, model number, and serial number.

1.11 CODE COMPLIANCE

A. All work and materials will comply with all applicable codes and regulations to meet or exceed Federal, State, City, and Local Building Codes and Regulations. Advise the Architect if anything in the Plans or Specifications is out of compliance with codes and/or laws prior to bidding.

1.12 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify the General Contractor in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The drawings diagrammatically show cabling, conduit, wiring, and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to the Consultant for approval, showing how the work may be installed.

1.13 GUARANTEES

A. The Contractor shall warrant new equipment to be free of defects in materials and workmanship for not less than one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty will be rectified by replacement or repair. Within the warranty period, provide answer to service calls and requests for information within a 24-hour period, and repair or replace any faulty item within a 72-hour period without charge, including parts and labor. This warranty period does not extend to any existing equipment which is reused in the project.

B. This warranty will not void specific warranties issued by manufacturers for greater periods of time. Nor will it void any rights guaranteed to the Owner by law.

C. Contractor to provide Owner with exact beginning and ending dates of the warranty period. Include the name of the person to call for service and telephone number. This information to be part of Project Record Set.

D. Contractor to provide a final site visit and verification that the system is operational, and all items are functioning correctly at the end of the warranty period. The contractor shall not be responsible for correcting items that have obviously been changed by the owner or end user.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section will not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the General Contractor or Owner.

B. All devices will have applicable approvals from a Nationally Recognized Testing Laboratory and meet all applicable local codes and requirements. Should any equipment lack proper approval the Contractor will arrange for onsite inspections and certification at no additional expense to the Owner.

2.2 ACCEPTABLE MANUFACTURERS

A. Model numbers and manufacturers included in this specification are listed as a standard of quality.

B. Consultant will consider other qualified manufacturers subject to review. The Contractor will supply complete technical data specifications at the time of proposed substitution. The Contractor will arrange for product demo at the request of the Consultant or Owner Representative and will pay ground freight shipping to and from site, or to and from Consultant's office. The Owner, General Contractor, and the Consultant reserve the right to accept or refuse any substitution without condition.

C. Consultant will consider other qualified manufacturers subject to review. Submit according to conditions of the Construction Contract and Project Manual.
   1. Proposed substitutions must meet all specifications of the specified equipment. The Contractor will supply complete technical data specifications at the time of proposed substitution.
   2. The Contractor will arrange for product demo at the request of the Consultant or Owner Representative and will pay ground freight shipping to and from site, or to and from Consultant's office.
   3. No product substitution will be accepted without the written approval of the Consultant and Owner. The Owner, General Contractor, and the Consultant reserve the right to accept or refuse any substitution without condition.
   4. Upon acceptance of a substitution, Contractor assumes all responsibility for verification and coordination of all heat, power, rack space and architectural requirements.

D. If product is discontinued and/or no longer publicly advertised as a part of a manufacturer's current product line-up at time of installation, the project team reserves the right to request a substitution of product for new and currently offered product of like function fulfilling the design intent. Substitution value will be based on fair market value of original product at time of bid.

2.3 GENERAL

A. Equipment and materials will be new, meet the latest published specifications of that product, and conform to applicable regulatory provisions. Take care during installation to prevent scratches, dents, chips, etc.

B. Install rack mounted equipment with black 10-32 button head machine screws.

C. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.

D. Provide engraved lamicoid labels at the front and rear of signal processing equipment mounted in racks. Mount labels on the equipment and attach in a neat, plumb, and permanent manner. Embossed labels will not be accepted. Only provide engraved labels at the rear of equipment mounted in furniture consoles.

E. Delivery, Storage and Handling.
   1. All products and materials to be handled and shipped in accordance with manufacturer's recommendation.
   2. Provide protective covering on equipment and furniture during construction to prevent damaging or entrance of foreign matter.
   3. Replace at no expense to Owner, product damaged during delivery, storage, handling or construction.

2.4 AV EQUIPMENT LIST

A. The base bid to include all product specified in Attachment A.

2.5 AV SYSTEMS

A. Audio Equipment Racks:
   1. Rack color: coordinate with Architect.
   2. Provide service lamp in the top of each rack.
   3. Verify exact rack space required.
   4. Mount racks on raised concrete slab.
   5. Provide & install rubber mat between raised slab and racks.
   6. Place racks to allow front and rear access.

B. Digital Signal Processor
   1. Interface DSP logic with fire mute in each rack location.
   2. Connect BLU Link cabling where necessary using only BSS approved Cat6 cable.
   3. See Section 3.2 for Programming Requirements.

C. Network Interfacing.
   1. Work with IT Provider and other contractors to allocate IP addresses and configure network VLANs to support AV system needs.
   2. All network capable equipment will be connected to the network, including but not limited to Amplifiers, DSP equipped speakers, wireless microphones, DSP, Playback devices and control systems

D. Power Amplifiers
   1. Each amplifier to have an engraved lamicoid strip, on the front and rear, stating amplifier number and which speakers it is feeding.
   2. Set all amplifier sensitivity switches to +26dB gain.
   3. Connect all amplifiers to the Nomad-Link Network

E. Loudspeakers.
   1. Coordinate all colors with Architect.
   2. All rigging to allow for +/- 10deg of horizontal and vertical adjustment.
   3. Provide a support structure for speaker systems sized to safely handle the system weight.

F. FM transmitter with headset receivers for Assistive Listening System.
   1. Contractor is responsible for verification of receiver quantities per project code requirements.
   2. Install antenna system in accordance with manufacturer’s recommendations.

G. Wireless Microphone Systems
   1. Select wireless frequency bands based upon frequency analysis preformed in Section 1.6.J.
   2. Ensure all modules necessary for a complete system are included.
   3. Ensure all cabling required for remote antenna locations is included.
   4. Contractor shall perform calculations to determine cable and connector loss based on install conditions. Install antenna boosters as required per calculations. Include this report with shop drawing submittals.

H. Projection Screens
   1. Unless otherwise noted on drawings, set limits so the bottom of projected images are 48” above finished floor in classrooms, conference rooms, and meeting rooms and 60” above finished floor in auditoriums and ballrooms. Include additional black drop as needed to meet projected images specified heights. Ensure deployed screens clear all wall protrusions and allow for future installation of wall mounted whiteboard or chalkboard.

I. Televisions and Mounts
   1. TVs must meet the following specifications:
      a. TV viewable diagonal sizes may be +/- 2” from that specified

b. Internal ATSC & QAM tuner
c. Internal speakers.
   1) TVs 42" and larger will have digital audio output following the selected input.
   2) TVs 42" and larger will have an analog audio output following the selected input with variable volume.
d. Wall mounted TVs are to be compliant with ADA clearance requirements. If the bottom of the TV is below 6'-8" AFF and the depth of TV plus wall mount exceeds 4", the contractor to provide ultra-low-profile mounts.
e. Controllable by 3rd party control system via hardwired RS-232 / serial port or hardwired network connection.
f. LED backlit LCD technology
g. VESA mount compatible
h. Acceptable Manufacturers
   1) Sony
   2) Samsung
   3) LG
   4) Panasonic
   5) Sharp

J. Audio Patchbays:
1. Provide rack mounted patchbays.
2. Label each patch point with unique wire label to match label on panel or equipment. Provide functional labels over groups of patch point to label destination hardware or location.
3. Full-normal patchbay
   a. Bittree B96DC-FNOST/E3 M2OU12B. (Qty. per design)
4. Half-normal patchbay
   a. Bittree B96DC-HNOST/E3 M2OU12B. (Qty. per design)
5. Patch Cords:
   a. Coordinate color with owner.
   b. Bittree BPC1800-110 (Qty. 24 per patchbay provided)
   c. Bittree BPC2402-110 (Qty. 12 per patchbay provided)

K. Data Patchbays:
1. Provide rack mounted patchbays.
2. Data patch point to match specification for cable terminating to patch point. Shielded cabling will require a shielded connector.
3. Label each patch point with unique wire label to match label on panel or equipment. Provide functional labels over groups of patch point to label destination hardware or location.
4. Modular Patch Panel:
   a. Install with printed labeling strip.
   b. Belden AX104563 24-Port 1RU (Qty. per design)
   c. Belden AX104564 48-Port 2RU (Qty. per design)
5. Cat6 UTP Connector
   a. Blue Keystone
   b. Belden AX104193 (Qty. per design)
6. Cat6 STP Connector
   a. Shielded Keystone
   b. Belden AX104596 (Qty. per design)

L. Fiber Patchbays:
1. Provide rack mounted patchbays.
2. Label each patch point with unique wire label to match label on panel or equipment. Provide functional labels over groups of patch point to label destination hardware or location.

3. Modular Enclosure:
    a. Belden AX105563 1RU FX UHD Housing (Qty. per design)
    b. Belden AX105564 2RU FX UHD Housing (Qty. per design)
    c. Belden AX105565 4RU RX UHD Housing (Qty. per design)
4. Splice Cassettes
    a. Provide Dual LC Connectors.
    b. Belden FC3H12LDFS OM3 Aqua Adaptor (Qty. per design)
    c. Belden FCSH12LDFS SM Blue Adaptor (Qty. per design)
    d. Belden FCSH12LAFS SM/APC Green Adaptor (Qty. per design)
5. Patch Cables:
    a. Provide all patch cables required for use, per system schematics, plus additional 4 matching patch cables per splice cassette.
    b. Belden FP3LDLD002M, OM3 2m
    c. Belden FPSLDLD002M, OS2 2m
    d. Belden FPSLALA002M, OS2/APC 2m

M. Video Patchbays:
1. Provide rack mounted patchbays.
2. Label each patch point with unique wire label to match label on panel or equipment. Provide functional labels over groups of patch point to label destination hardware or location.
3. Normalled patchbay:
    a. Bittree B64T-2MWNHD (Quantity Per Design)
    b. Bittree VPCM 24 02-75 Patch Cords (Qty. 8 per patchbay provided)
    c. Bittree VPCM 24 05-75 Patch Cords (Qty. 8 per patchbay provided)
    d. Bittree VPCM 24 06-75 Patch Cords (Qty. 8 per patchbay provided)
    e. Bittree ADMW48 BNC to Mini-WECO (Qty. 4 per patchbay provided)

2.6 CUSTOM PANELS

A. Panels to be fabricated by Contractor, engraved and loaded with connectors with information shown on Drawings.

B. Unless otherwise specified, all wall and ceiling panels will be 1/8-inch-thick, anodized aluminum. (Brush in direction of aluminum grain only.) Engraving will be 1/8-inch block sans serif characters.
1. Coordinate all panel colors/finishes with Architect.
2. All custom panels will have beveled edges.
3. Text color will be white for all black/dark colored panels and black for all white/light colored panels.
4. Connector color wll be silver for all white/light colored panels and black for all black/dark colored panels.
5. Plastic plates will not be accepted.
6. Where Extron, Crestron, or other manufacturer's transmission equipment will be mounted on a wall or ceiling plate visible to the public, uses Decora style plates, coordinate color of equipment and wall plate with Architect.
7. Wall panels sizes to be coordinated with J-boxes dimensions and mounting conditions.
    a. Panels mounted on surface mount boxes will not protrude beyond the edge of the box thereby creating a sharp edge condition.
    b. Panels mounted on flush mount boxes will extend beyond the edge of the J-box by 1/4" on all sides.

C. Unless otherwise specified, all rack panels and floor box panels will be 1/8-inch-thick, black anodized aluminum. (Brush in direction of aluminum grain only.) Engraving will be 1/8-inch block sans serif characters. Lettering will be white.
1. Coordinate all panel finishes with Architect.

2. Connector color will be silver for all white/light colored panels and black for all black panels.
3. Rack panels will be standard EIA sizes.
4. Plastic plates will not be accepted.

D. Floor Boxes will be flush mounted.

E. Panels in outdoor or harsh environmental conditions will be stainless steel and contain connectors fit for their environment.

F. Contractor will submit panel engraving schedule and fabrication drawings for approval

G. Panels to be manufactured by one of the following manufacturers:
1. Panel Authority
2. Proco
3. RCI
4. Whirlwind

H. Panel Connectors.
1. Panels to contain components listed below:
a. Female XLR: Neutrik NC3FD-L-B-1.
b. Male XLR: Neutrik NC3MD-L-B-1.
c. Locking 1/4": Neutrik NJ3FP6C-B.
d. Female XLR-1/4” TRS Combo: Neutrik NCJ6FI-S
e. Rugged RJ45: Neutrik NE8FDX-P6-B or NE8FDX-Y6-B
f. BNC (75 Ohm): Neutrik NBB75DFIB-P
g. BNC (50 Ohm): Canare BJ-JRUD
h. 4-Pole Speaker: Neutrik NL4MP
i. 8-Pole Speaker: Neutrik NL8MPR-BAG
j. Mass Connectors: Whirlwind W-series
k. Triax: ADC ProAx Plugs and Jacks w/45 Degree Mount Kit.

2.7 CABLE, CONTROL WIRING & TERMINATIONS

A. Electrical conductors installed under this contract, except where otherwise specified, will be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper.

B. Refer to drawing AV0.00 for scope of work related to supply, installation, and termination of cable.

C. Refer to drawing AV0.00 for cables to be used.
1. Use plenum and underground cables as required by code.
2. It is assumed all underground cables, where they transition to cable tray or free air, will not pass through plenum spaces outside of conduit.

D. Refer to drawing AV0.00 for minimum cable lengths required outside of boxes.

E. The Contractor will verify all connector details required for installation of equipment, including make, model, connector sex, attachment configuration, pinouts, and cable clamp accessories.

F. Video Connectors: All primary video equipment will use crimp-on style BNC connectors. If consumer grade equipment is furnished with RCA connectors, the cable will be terminated in a crimp-on style RCA connector. It will not be acceptable to use BNC to RCA adapters for consumer grade connections.

G. Video Terminators: Video terminations will be comprised of commercially available 75-ohm 0.1% tolerance units with integral BNC connectors, which are applied as required, plus a 20-count spare.

H. Speaker Level Rail Mounted Terminal Blocks:
1. To be used in speaker cluster and Equipment Room junction boxes where shown on schematic drawings or as required by field conditions
a. Rail-Mounted Terminal Blocks
1) Positive Terminal (+): Orange Part #2010-1302

2) Negative Terminal (-): Gray Part #2010-1301
b. Mount on non-corrosive DIN rail
1) Wago 210-112
c. Use insulated Ferrules on all terminations
1) 8 AWG: Wago 216-289
2) 10 AWG: Wago 216-288
3) 12 AGW: Wago 216-287
4) 14 AWG: Wago 216-286
d. Crimp with
1) 6-10 AWG: Wago 206-216
2) 12-24 AWG: Wago 206-204
e. Use end and intermediate plates
1) Orange: Wago 2010-1392
2) Grey: Wago 2010-1391
f. Use push-in jumpers as required
1) Wago 2010-4xx
g. Use marking strip system
1) Wago WFB Continuous Marking Strip

I. Microphone and Line Rail Mounted Terminal Blocks
1. To be used in Equipment Room junction boxes where shown on schematic drawings or as required by field conditions
a. Rail-Mounted Terminal Blocks
1) Wago 280-550
b. Mount on non-corrosive DIN rail
1) Wago 210-112
c. Use insulated Ferrules on all terminations
1) 20 AWG: Wago 216-222
2) 22 AWG: Wago 216-221
3) 24 AGW: Wago 216-321
d. Crimp with
1) Wago 206-204
e. Use end and intermediate plates
1) Wago 280-305
f. Use push-in jumpers as required
1) Wago 280-4xx

J. Cable Mount Connectors.
1. Cables to use components listed below, unless otherwise noted:
a. Female XLR: Whirlwind WI3F-BK
b. Male XLR: Whirlwind WI3M-BK
c. Male XLR Numbered: Whirlwind WI3M -BK-#
d. To be used on all audio console and stage box inputs.
e. 1/4" TS: Switchcraft 280
f. 1/4” TRS: Switchcraft 297
g. Rugged CAT6 RJ45: Neutrik NE8MC6-MO
h. RCA: Canare 75 Ohm
i. BNC (75 Ohm): Canare 75 Ohm
j. BNC (50 Ohm) Type F Cables: Amphenol Connex 112563
k. BNC (50 Ohm) Type G Cables: Amphenol Connex 112120
l. 4-Pole Speaker smaller than 12AWG: Neutrik NL4FC
m. 4-Pole Speaker greater than 12AWG: Neutrik NLT4FX-BAG

n. 8-Pole Speaker smaller than 12AWG: Neutrik NL8FC
o. 8-Pole Speaker greater than 12AWG: Neutrik NLT8FX-BAG
p. Mass Connectors: Whirlwind W-series
q. Triax: ADC ProAx Plugs and Jacks.
r. SM Fiber Optic: Amp Metallic ST style (Flat Finish)

K. Use the following chart for color coding cables for use in the AV systems. Please see the drawing package for specific cable part numbers

Signal Type	Letter	Color
HD Video	H	Violet
SDI Video	H	Blue, Light
Composite Video	H	Green
Bi-Level Sync/Reference	H	Red
Tri-Level Sync/Reference	H	Orange
V-TIE (multi-use)	H	Grey
Triax Camera Cable	T	Black
Multicore Camera Cable	M	Black
Analog Line Level Audio	D	Green
Analog Mic Level Audio	E	Orange
Digital Audio (AES)	X	Yellow
Time Code	E	White
RF (Distributed)	K	White
RF (Trunk Line)	L	Black
RF Antenna	F/G	Black
Tally	E	Chrome
RS-232/422/485 Control	R	Chrome
Network 10/100/1000	U	Yellow
Network Facility LAN	U	Blue
KVM	U	Green, Dark
Intercom	E	Brown
Speaker	A	Grey

2.8 J-HOOKS, CABLE HANGER AND TIES

A. Non-metallic cable support systems such as J-hooks, ties, etc. must be CMP, plenum rated or CMR, riser rated, where applicable. Panduit J-Pro J-hooks Caddy brand “Cable-Cat” hangers or owner and engineer approved equal.

B. Metallic cable support systems such as J-hooks or Caddy brand “Cable-Cat” hangers must be CMP, plenum rated.

C. J-hooks will provide a fully radiused support structure with no tight corners to pinch or bind cables, must provide a minimum 1" wide load bearing surface with a minimum 1/4" radius edge.

D. Cable support system devices will be provided complete with cable retainer.

E. Cable installation accessories (e.g. pulleys for J-hooks) may be provided and utilized as applicable in compliance with TIA/EIA standards.

F. "Velcro" type cable wraps will be utilized for cable management only, in the horizontal plane and the vertical plane in MDF, BDF, TR and data cabinets. “Velcro” may not be used in other locations requiring vertical support.

G. Cable ties of a minimum 0.190" width, installed in a figure 8 pattern around the support member and crossing over the cable/cables will be utilized for cable management and support in a vertical plane.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.

C. Cover edges of cable pass-through holes in chassis, racks, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting. Adhesive-backed electrical tape and friction tape is not acceptable for insulating or protective purposes.

D. Equipment Racks

E. Mount equipment in racks and consoles and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Consultant in writing that racks will be fabricated on site and the reasons for the change.

F. Provide and install equipment racks as specified under this section in a manner in keeping with local seismic codes. Racks located on concrete floors in equipment rooms or non-finished spaces are to be mount on a 4 inch di-electrically isolated riser such as a 4-inch concrete riser, provided by Division 3. Ensure that all equipment racks are electrically decoupled from flooring to prevent coming into contact with any safety grounded items during operation by providing rubber mat-style isolation between racks and riser.
   1. Inspect all racks, consoles, and enclosures prior to installation. All rough or sharp edges that may cause injury to personnel must be deburred or a permanent protective coating applied.
   2. Design and provide ventilation adequate to keep temperature within the rack below 85 degrees Fahrenheit. This ventilation system must be temperature actuated.
   3. Provide blank rack-mount panels installed in all rack openings not occupied by equipment. Blank filler panels will not exceed five rack units in size. Install rack mounted equipment with black 10-32 Phillips head machine screws.
   4. Looking at the rack from the rear, locate AC power, digital control, DC control, and speaker wiring on the left; microphone, line level audio, and video wiring on the right. Panels or equipment mounted on the rear rack rails will not block access to any front mounted components.
   5. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.
   6. Install rack mounted equipment with black 10-32 button head machine screws.
   7. Panels or equipment mounted on the rear rack rails must not block access to any front mounted components. Front mounted equipment will be given ample space to allow for access to rear connection.
   8. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.

G. The process of acceptance testing the System may necessitate moving and adjusting certain component parts - e.g., video monitors.

H. AC Power and Grounding

1. The Contractor will be responsible for the supply and installation of AC power connections and circuits within the equipment racks that are to be provided under this section. The Contractor is to provide a 6"x6" J-Box at the top of each rack with power circuit cabling terminating in 24" pig tails. The Electrical Contractor will provide all AC power and conduit to the equipment racks and will terminate AC power circuits within J-Boxes at bottom/top of racks.
2. Install 3-conductor, 120 VAC outlets in each rack. Provide a minimum of two spare outlets in each rack. Label each outlet as to which AC circuit is feeding it and provide the same information in the circuit breaker panel.
3. The A/V system technical ground will be bonded to the metal frame of all equipment racks by use of an uninsulated ground buss lug or bar mounted in each rack. When more than one rack exists, all equipment buss lugs will be bonded to one central equipment rack buss lug. This central equipment rack buss lug will be the only connection to the A/V system technical ground conductor. The ganging of racks together with mechanical fasteners is not an acceptable method of bonding the video system technical ground between racks.
4. Where conduits for the Sound, Communication and Video system enter equipment racks; there will be a dielectrically insulated ground joint union (mfg. by Central Plastics, or Capitol Equipment, or RobRoy) that will isolate the conduit system from the chassis of the rack.

3.2 DSP AND CONTROL SYSTEMS PROGRAMMING

A. DSP Programming
1. The audio systems for spaces described above will be controlled through a Digital Signal Processing System. This will provide all equalization, cross-over settings, level control, muting, routing, level monitoring, etc. With direction from the AV Consultant, the AV Contractor will develop signal flows for each of the systems as well as comprehensive GUIs for typical day-to-day operational control. These control screens will be accessible through both wired and wireless computers and wireless touch screen tablets. Several levels of user access are expected.
2. Pages will be formatted and sized appropriately for display resolutions of the control computers and wireless tablets. Multiple versions of some pages may be required to work with different display resolutions.
3. The DSP platform will be controlled by external devices via contact closures, TCP/IP, or serial protocols. The DSP system will be heavily controlled through the Control System described below.

B. Control Systems
1. Provide control and monitoring of display devices, play back devices, audio Digital Signal Processing, and other AV equipment as applicable. Control of the DSP system will be extensive with numbers controls (100+) having to be accessed by the Control System.
2. The control platform will also interface with architectural and theatrical lighting, shade system, and building control systems as applicable for each space to provide different looks and comfort amenities.
3. Wired and wireless touchscreen user interfaces will control technical system in each space. Each user interface will be tailored for the specific control needs based on the intended user and installed location. All user interfaces will be configured to operate in two modes.
   a. Simple user mode:

1) Control screen workflow will be activity (also called preset) based. User will select an activity, the technical system will configure for the selected activity, and only necessary control elements will be available on the user interface. When additional control elements are needed the user will switch to an activity including those elements, or select the advanced mode. Activities to be coordinated with client. Example activities include
    a) Computer Presentation
    b) Video Conference
    c) Watch TV
    d) Watch a Movie.
2) Within each activity the control screen will be built around a single page layout with popups displaying control elements as needed. The interface layout will be consistent across all activities with commonly used control items always shown. Commonly used control items include source volume with mute, mic volume with mute, lighting presets, power, source preview, audio conferencing and advanced.
3) Control will include, but not limited to the following:
    a) Control of preset video layout and source selection of windows within preset video layout.
    b) Routing input sources to confidence monitors.
    c) Provide full screen, live preview of inputs sources before adding them to the LED display.
    d) Control basic lighting presets.
    e) Control basic audio functions including source selection and source and microphone volume.
    f) System power on/off

b. Advanced mode:
1) Control screen workflow will be designed for maximum flexibility and speed by technical users. Technical users will have training on the specific systems installed in the building. Control screens will include full control of all technical system devices available to the audio video control system.
2) Interface will consist of multiple pages. Dedicated troubleshooting pages will be provided with real time feedback from AV equipment, including connectivity status of router input and output devices and input and output sources, etc.

4. Spaces with a control panel but not a dedicated central controller will use resources from any available controller on the network.
5. The Contractor will coordinate with building IT staff and facilities staff as necessary to interface with LAN, WiFi, building management, and lighting control systems.
6. All custom programming configurations and code will remain the property of the owner.
7. All passwords and login information and software licenses related to the control systems programming will be provided to the owner for their distribution as appropriate among staff and end users.
8. Prototype control screen templates will be presented to the owner and consultant for review 8 weeks prior to systems commissioning.
9. Beta level control systems programming that have been tested with equipment will be provided for consultant review 4 weeks prior to commissioning.
10. Completed base programming and structure will be tested and operational during system commissioning.
11. One major owner requested revision lists to functionality and GUI layout will be incorporated into the control system programming during the first year of building operation after the first systems use. The anticipated amount of programming time for each of these is 1 day.

3.3 CUSTOM CONSOLE AND WORK SURFACE DESIGN

A. All consoles and casework items will be rigidly constructed and will allow for a minimum temporary additional load of 200 pounds on any horizontal surface without permanent deformation.

B. Consoles will be steel frame construction using extruded hollow square and angle sections welded together to form the sub-frame. This sub-frame will form the structural support for all equipment loads, work surfaces and writing surfaces.

C. The steel frame will be electrically arc welded or similar. Remove all spatter and grind off excess weld and burrs. Prepare for shop priming by power wire brushing to remove rust. Degrease, shop prime, and finish with paint finish as specified. Protect for transport and shop/site and apply touch up paint as necessary. All arc weld hardware will be degaussed after the completion of all welding to be done on the piece.

D. All dimensions and profiles will be checked with all right-angles true and uniform. Use blank rack mount panels to confirm accuracy of mountings.

E. All attachments to viewable surfaces will be concealed. Attachments through the finish face of painted sections will be countersunk 1/4" below the surface. A resilient packing 1/16" thick will be placed over the screw before the hole is filled with a 2-part epoxy and finish sanded. When fitting panels allow clearances for paint finished. All laminate will be accurately scribed and fitted to the profiles required. Joints will be glued and screwed using frets or glue blocks where possible to ensure rigidity of the panels independently of the steel frame.

F. Perforated metalwork will be folded accurately to match adjacent profiles with 3/4" returns lapped and spot welded to form a rigid unit. Hinges and accessories will be chrome or brass, including screws.

G. All consoles will have removable rear panels for rear access to installed equipment. Removable front "kick panel" doors will also be required. All panels will remove completely during installation and service to facilitate installation work. The panels when installed will present a neat and finished appearance and will have a secure mechanical latch mechanism to avoid any rattles or buzzes.

H. Provide a suitable method of cable access through the bottom and between sections of consoles.

I. Control interfaces and panels mounted in custom fitted cutouts will provide a non-gaping interface to the surrounding surface to within a 1/32" tolerance.

J. Clearances: There will be a minimum of 1 inch clearance inside all consoles between the top equipment mounting space and the console top. This is to allow airflow above equipment mounted in the top mounting position. Provide adequate ventilation grilles to allow continuous cooling in consoles containing equipment. This should include both supply and exhaust grilles. Provide ventilation adequate to keep temperature within the rack below 85 degrees Fahrenheit. Provide whisper type ventilation fan in each rack if temperature in rack rises above 85 degrees. This ventilation system must be temperature actuated.

K. All consoles and racks will have front and rear rack rails separated by at least 24 inches. The rails will be parallel and square and will conform to EIA RS-310C for 19-inch racks.

L. Console work surfaces will be finished with a material and color selected by the Architect and Owner. Painted and metal panels will be finished with sprayed polyester lacquer, satin finish, and color as selected by the Architect and Owner. Steel frame finish will be black enamel.

M. Painting:
   1. Surface Preparation: Preparation for painting will involve fine paper sanding and dusting to ensure a perfectly smooth substrate.
   2. Primer: Sealer undercoat will be spray applied and sanded back using 250 grit. Touch up as needed and re-sand.

3. Finish coats will be spray finished in an appropriate spray booth with approved ventilation, humidity control, dust extraction, and lighting. Finished paint thickness will be 1 mil minimum and will be free from runs, orange peeling, blooming or other blemishes. Metal panels will have a similar finish using appropriate metal primer.

3.4 CABLING

A. Execute wiring in strict adherence to "standard broadcast practices," as excerpted from "Recommended Wiring Practices," Broadcast Audio Equipment for AM, FM, Television (5th Edition), Radio Corporation of America (RCA), Camden, N.J. 1962, and Appendix II, "Recommended Wiring Practices", Sound System Engineering, (2nd Edition), D. Davis, and performed in accordance with standard professional practice.

B. Take precautions to prevent and guard against electromagnetic and electrostatic hum. For line level audio signals, float cable shields at the output of source device. Shields not connected to be folded back over cable jacket and covered with heat-shrink tubing. Do not cut off unused shields.

C. Exercise care in wiring; damaged cables or equipment will not be accepted. Isolate cables of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation. Keep wiring separated into groups for microphone level circuits, line level circuits, loudspeaker circuits, power circuits, video circuits and control/data circuits.

D. Route unbroken microphone, audio line, and control wiring from receptacle plate/chassis to patch panel/rack. Remove spliced cables and replace without additional charge to the Owner.

E. Wiring entering equipment racks will be run directly to equipment. Use of splices or connectors to extend cabling to equipment will not be accepted. All signal wiring will be continuous and unbroken from connector plate/chassis to chassis/patch panel. Use of intermediate connections for inter rack cables is not acceptable. Use of splices or connectors to extend cabling to equipment is not acceptable.

F. Make joints and connections with rosin-core solder or with mechanical connectors approved by the Owner. Where spade lugs and BNC terminations are used, trim cable using manufacturer recommendations and crimp properly with ratchet type tools. Spade lugs mounted on 22 gauge or smaller cable to be soldered after crimping.

G. Connect audio cable to active components through screw terminal connections and spade lugs whenever available. Make connections to speaker transformers with properly sized closed end connectors crimped with factory approved ratchet type tool. Wire nut or "Scotchlock" connectors are not acceptable. Do not wrap audio cable splices or connections with adhesive backed tape.

H. Connect loudspeakers electrically in phase, using the same wire color code for speaker wiring throughout the project.

I. Wiring and connections will be completely visible and labeled in rack.

J. All power cables will run on the left side of the equipment rack, as viewed from the rear. All other cables will be run on the right side on the equipment rack, as viewed from the rear. Where signal cabling and any cabling types carrying power must cross, they will do so at right angles. Vertical wiring will be run with a bundling and support system, to maintain a clear and organized appearance.

K. Horizontally routed wiring to equipment will be neatly tied in manageable bundles with cable lengths cut to minimize excess but still allow ready access for service and testing. Provide horizontal support bars if cable bundles sag

L. For equipment mounted on slides, additional service loops will be provided to accommodate the full range of travel of the slides. This includes all power, ground, control and signal cables.

M. Neatly bundle excess AC power cables from rack-mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive backed cable tie anchors are not acceptable. Cable tie and lacing installation will be accomplished using hand tools specifically designed to apply proper tension to the cable tie, and to cut it off flush with no protruding sharp edges. Cable ties will not be applied with excessive force, which may damage or deform sensitive and fragile cables.

N. All cables in cable trays will be neatly installed with maintaining separation of the different cable types.

O. Required production room cable paths and lengths must be predetermined especially in instances where timing is a factor. The information that is essential for the implementation of this task is as follows:
   1. Site Survey
   2. Floor and Ceiling Plans
   3. Elevation Design
   4. Equipment List
   5. Video and Audio Schematics
   6. Cable Trays and Conduits

P. Multiconductor Cables: Follow a uniform application of color codes for multiconductor cables throughout the Facility. Where there are unused conductors or pairs in a cable assembly, they can be insulated as a group, left long enough for future termination, and folded into the connector hood. Where this is impractical, they may be folded back along the outer jacket of the cable and covered with heat-shrinkable tubing.

Q. Multipin Connectors: Where jumpers are indicated between pins of the same connector, they will be installed internal to the connector shell and will not have any cable number designations applied to the jumper.

3.5 CABLE HOOKS

A. Whenever possible, cable and raceway routing paths will follow the logical structure of the building (e.g. follow hallways, aisles and corridors). Route all AV cables and raceways parallel to or perpendicular to the building structure. No diagonal runs will be permitted unless noted otherwise or pre-approved by the Architect and Consultant. Corridor crossovers will be kept to a minimum.

B. The suspended ceiling and/or lighting fixture support wire or rod will not be utilized to support AV cables. Do not support cables from ductwork, plumbing lines, fire suppression or mechanical systems, etc. Do not lay AV cables on ductwork, piping, plumbing systems or on top of lay-in ceiling tile and lighting fixtures.

C. Support spacing will not exceed 48". For spans longer than 48", the Contractor shall provide cable tray, channel, ladder, conduit, or other Consultant approved cable support.

D. A maximum of 17 cables will be supported in a single hanger, no exceptions.

E. An open ceiling distribution system will not be installed above inaccessible ceiling areas, such as "lock-in" type ceiling tiles, drywall or plaster. Adequate and suitable space will be available in the ceiling area for the distribution system. A minimum of 6" of clear space will be provided on all sides of the distribution system to accommodate installation and servicing.

3.6 LABELING

A. General

1. The attachment method for equipment identification plates will be designed for permanency unless otherwise described. All labels will be protected prior to installation and will not be installed if damaged or scratched. Follow manufacturer's recommended procedure for surface preparation, which must be free of any dust, dirt or film. Wiping with a manufacturer-approved solvent is required. If a label is in a place that might be susceptible to damage, it will be protected with a layer of clear plastic, 1/16" or thicker, taped down. Internal labels will be replaced only if they become illegible. External labels will be replaced if they become scratched or marred.
2. On black lamicoid panels or pushbuttons, letters will be white; on stainless steel or brushed natural aluminum plates, or light-colored pushbuttons, letters will be black.
3. Embossed labels are not acceptable.
4. Mount labels in a neat, plumb and permanent manner except where indicated.
5. Text heights will be as follows:
    a. Rack designation labels will have 1" high block sans serif text.
    b. Equipment labels will be 3/4" high block sans serif text.
    c. Operator Control labels will be 1/4" high block sans serif text, this may be adjusted to fit available space.
    d. Panel labels will be 1/8" high block sans serif text.
    e. Patchbay, Cable and Connector labeling will be 10-point block sans serif text, this may be adjusted to fit available space.

B. Equipment Labels
1. Provide engraved lamicoid labels on the front and rear of active equipment mounted in racks. Front mounted equipment labels for the Production Suite video monitor wall monitors are to be mounted with Velcro. Equipment labels to have one line of engraving, giving the schematic reference of the device, and/or its production function, i.e. "VTR #4", "PA-29A".
2. Amplifier labels to include the schematic reference of the device as well as the loudspeaker being fed. Provide color coded labels for the different levels and types of speakers.
3. Unless equipment manufacturer has clearly labeled functions, provide an engraved label over each user-operated control that describes the function or purpose of the control.
4. If the manufacturer provides a protected labeling strip such as those used for switcher control panels and patch bays, then patch/routing point labels may be typed clearly on 80 pound paper stock.

C. Cable Labels
1. Cables and wiring to be logically, legibly and permanently labeled for easy identification. Labels on cables to be adhesive strip type covered with clear heat-shrink tubing. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style label. Hand-written or self-laminating type labels are not acceptable.
2. Wiring designations to be an alphanumeric code that is unique for each cable. Locate the cable designation at the start and end of each cable run and within 2 inches of the point of termination or connection. For cable runs that have intermediate splice points, the cable will have the same designation throughout with an additional suffix to indicate each segment of the run. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings included with Project Record Drawings.
3. Provide adhesive labels on the rear of equipment where cables attach to indicate the designation of the cable connected at that point.

3.7 ACCEPTANCE

A. Provide a pre-commissioning system report to the Consultant two weeks prior to the scheduled systems commissioning proving all systems to be in full compliance. Report will include test results, date of each test, pertinent conditions such as control settings, etc., and test equipment employed. In addition, submit written notification that the installation has been completed in accordance with the requirements of the Contract Documents, and is ready for acceptance testing.

B. Acceptance testing will include operation of each major system and any other components deemed necessary by the Consultant. Contractor will assist in this testing and provide required test equipment. Contractor will provide at least three technicians familiar with installation, available for the entire testing period (day and night), to assist in tests, adjustments, and final modifications. Tools and material required to make any necessary repairs, corrections, or adjustments will be furnished by the Contractor. The Contractor will keep a running list of all acceptance tests performed and submit a final copy of the results with the closeout submittals as listed in Part 1.6. Testing process is estimated to take 1 days up to 8 hours per day and may require multiple crews / shifts.

C. During all consultant walkthroughs, the project manager will be present.

D. If during acceptance testing it becomes evident that further adjustment or work may be required to bring the system into compliance, the Contractor will continue to work until the system is acceptable at no additional charge to the contract price. If approval is delayed because of defective equipment, poor installation, or failure of equipment to meet the requirements of these specifications, the Contractor will pay for additional time and expenses of the Consultant at the Consultant's standard rate in effect at that time, during any extension of the acceptance testing period. The Contractor will provide rental or loaner equipment to make the system operational in critical cases of equipment failure prior to contract completion.

E. Provide five portable UHF business band radios for use during acceptance testing. Radios should have a transmission range enough to cover entire project. Radios to include rechargeable batteries and re-charger along with "holster" for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance. Confirm that radio frequencies used are not in use elsewhere on project site.

F. Verify the following before beginning actual tests and adjustments on the system:
   1. Electronic devices are properly grounded.
   2. Powered devices have AC power from the proper circuit and hot, neutral, and ground conductors are connected correctly.
   3. Insulation and shrink tubing are present where required.
   4. Dust, debris, solder, splatter, etc. is removed.
   5. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.

G. Cabling Tests.
   1. Submit printed test reports proving the systems to be in full compliance to the consultant as part of the pre-commissioning systems report.
   2. After installation, and before termination, all wiring and cabling will be checked and tested with a megohmmeter to ensure there are no grounds, opens, or shorts on any conductor or shields.
   3. Verify all audio lines are wired to maintain proper continuity and polarity.
   4. Perform TDR measurements on all triax and coax video cables.
   5. Perform sweep tests on all triax and coax cables with a spectrum analyzer. When documenting the results of these tests, include the calculated loss based on length of the video cable measured with the TDR. Correct cabling for any field readings that differ more than 20% from the calculated loss.
   6. Test all CAT5E and CAT6 cables to verify they meet full specifications. Tests will use a certified tester that will confirm bandwidth, cable distance, and error and bit rate detection.

7. Optical Fiber Cable Testing
   a. Test all fiber optic cable strands for continuity and performance before and after the cables are pulled and terminated.
   b. Test link attenuation of all installed multimode fiber optic strands after splicing and termination in accordance with ANSI/TIA/EIA-568-C.1, Section 11.3.
      1) One direction with an optical light source and an optical power meter.
      2) Test at two wavelengths to account for attenuation differences due to wavelength:
      3) 850 nm and 1300 nm for multimode strands.
      4) 1310 nm and 1550 nm for singlemode strands.
      5) Test multimode strands in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper.
      6) For multimode strands, wrap reference jumper around mandrel to remove high-order mode transient losses as specified in ANSI/TIA/EIA-568-C.1, Section 11.3.3, Table 11-15.
      7) Test Singlemode strands in accordance with ANSI/EIA/TIA-526-7, Method A.1, One Reference Jumper.
      8) The total attenuation budget for each fiber cable length (end-to-end) will equal the allowed attenuation for the fiber (0.2 dB per km times the length in km) plus the attenuation for each splice and connector. For example, a cable length of 3 km with 1 splice and 2 connectors would have an attenuation budget of (3 km x 0.2 dB/km) + (2 x 0.2 dB) = 1.2 dB.
   c. Test all installed fiber optic strands after splicing and termination with an OTDR (Optical Time-Domain Reflectometer) per TIA/EIA-455-61:
      1) End-to-end bi-directional signature trace with fault finding, connection point reflection, fiber bend, pressure point location, etc.
      2) One wavelength, 1300 nm for multimode strands.
      3) One wavelength, 1550 nm for singlemode strands.
      4) Multimode fiber connector losses $\leq$ 0.5 dB at 850 nm
      5) Singlemode fiber connector losses $\leq$ 0.2 dB at 1310 nm
      6) Multimode fiber splice losses $\leq$ 0.3 dB at 850 nm
      7) Singlemode fiber splice losses $\leq$ 0.2 dB at 1310 nm
      8) Localized attenuation will not exceed 0.5 dB at any point
   d. Fibers that are broken or damaged will be replaced at no cost to the owner and replaced fiber optic cables will be re-tested.
   e. Provide test results in both PDF and in the native file format of the OTDR.
8. Loudspeaker System Tests. Perform the following tests and adjustments. Make corrections necessary to bring system(s) into compliance with the specifications.
   a. Measure and record the impedance of each loudspeaker at the equipment rack with the amplifier disconnected. Measurements will be documented in a table that lists the impedance for each 1/3 octave band over the loudspeakers operating frequency. Measurements will be accurate to within one-tenth of an ohm. As an alternative, contractor may perform, and document full impedance sweeps over each individual device. Sweep to be performed over loudspeakers specified operating range.
   b. Check polarity of loudspeakers with an electronic polarity checker and by applying music program or constant power per octave (pink noise) signal to system while walking through the transition areas of coverage from one loudspeaker to the next. Transition should be smooth with no apparent shift in source from one speaker to the next.
   c. Apply sine wave sweep signal to each loudspeaker system, sweeping from 50 Hz to 5k Hz and at a level 10 dB below full amplifier output, and listen for rattles or noise. Correct if apparent.

9. Microphone, line level, and Tie Lines Systems. Confirm the following. Make corrections necessary to bring system(s) into compliance with the specifications.
    a. Proper circuits appearing at each termination location.
    b. Continuity of all conductors.
    c. Proper polarity is maintained.
    d. Absence of shorts between conductors.
    e. Absence of shorts between conductors and conduit.

H. System Tests.
1. The following procedures will be performed by the Consultant:
2. Audio fidelity Verification: Driving the system with pink noise and measuring the response from 40 Hz to 16k Hz. Digital Signal Processing will be used to adjust the response of the system (s) to fit the requirements of the space.
3. Video Signal Verification: From all source inputs (for cameras, character generators, video tape units, etc.) through all VDAs, A/D and D/A converters, processors, switchers, etc., to all signal destinations. Verification of correct signal timing for each source via each path will be made using standard test patterns. Each processing device will be checked; the signal will pass through the device in the no processing mode such that unity luminance, chrominance, and signal timing and phasing conditions are achieved.
    a. Video.
        1) Volt (peak to peak) throughout video signal path
        2) S/N (peak to RMS), unweighted, DC to 4.2 MHz: 55 dB minimum
        3) Crosstalk, unweighted, DC to 4.2 MHz: 45 dB minimum
        4) Frequency Response: + 0.5 dB to 4.2 MHz
        5) Line and Field Tilt: 2% maximum
        6) Differential Gain: 2% maximum
        7) Differential Phase: 2 degrees maximum
        8) Signal level: within plus or minus 0.5 dB
        9) System timing: Sync coincidence within 20 nanoseconds
        10) Color timing: Within 1/2 degree at 3.58 MHz
    b. Digital Video.
        1) Verify strength of data signal throughout video signal path.
        2) Verify validity of data timing signals.
        3) Verify receiving device clock recovery
        4) Report input data errors
        5) Report transport layer errors
4. Control functions will be checked for proper operation, from controlling devices to controlled devices.
5. Adjust, balance, and align equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and record these settings, in the "System Operation and Maintenance Manual".
6. Installed and loose equipment will be inventoried for correct Qty.
7. Any other test on any piece of equipment or system deemed appropriate by Consultant.
8. The omission of a description of a device, function, signal path, or test in this document will not exempt the Contractor from responsibility for checking all devices and signal paths for appropriate compliance with Industry Performance Standards and making corrections necessary to bring system(s) into compliance with the applicable standards.

9. The process of acceptance testing the System may necessitate moving and adjusting loudspeaker aiming. Contractor to adjust loudspeaker aiming within parameters set in Part 2. Contractor to make changes without claim for additional payment, this includes the use of lifts, scaffold, etc. If the construction timeline or architecture interferes with the ability to make changes during acceptance testing, notify consultant in writing prior to loudspeakers becoming inaccessible so that final on-site aiming may be accomplished.

3.8 TEST EQUIPMENT

A. Provide the following equipment on site for final acceptance testing. Test equipment to be available for the entire period through final system acceptance. Prior to start of testing, provide a list to the Consultant of test equipment make and model numbers that will be used.
   1. Multimeter: Measurement range, DC to 20,000 Hz, 100 mV to 300 V, 10 ma to 10A. Acceptable: Fluke 75.
   2. Dual-trace oscilloscope: 20 MHz bandwidth, 1 mV/cm sensitivity.
   3. Sound Level Meter: ANSI S1.4-1971 Type S1A with digital or analog display. Meter to provide ranges of 40 to 120 dBA.
   4. Impedance Meter: Capable of testing audio lines at three frequencies, minimum, between 250 Hz and 4k Hz. Measurement Range: 1 ohm to 100k ohms.
   5. Audio Oscillator: bandwidth 20 Hz to 20k Hz +1 dB at 0 dBm output. Output to be balanced. Oscillator to include adjustable output level.
   6. Polarity checker for mic and line level signals.
   7. Polarity checker for loudspeakers.
   8. (2) full height weighted base mic stands
   9. Time Domain Reflectometer.
   10. Optical Time Domain Reflectometer: Fluke Optifiber, Corning OV1000, or equal.
   11. SDI Generator: Acceptable: Tektronix SDA601
   12. SDI Analyzer: Acceptable: Tektronix TSG601
   13. Digital Field Strength Meter: Acceptable: Blonder Tongue DFSM-10 or Tektronix RFM90
   14. CAT6 cable tester: Acceptable: Microtest Omniscanner 2.
   15. Acterna (Formerly Wavetek) SDA-5000 Sweep System
   16. Digital Field Strength Meter : Acceptable: Blonder Tongue DFSM-10 or Tektronix RFM90

3.9 INSTRUCTION OF OWNER PERSONNEL

A. Upon completion of the installation of the specified AV systems, and prior to any facility events, provide designated operating personnel training on the equipment operation. This training will be performed at the site by the Contractor's and the manufacturer's education staff.

B. The System Reference and Service Manuals must be complete and on-site prior to the time of the first instruction.

C. Coordinate schedule of instruction with the Owner subject to availability of Owner's personnel. This may require scheduling instruction during weekends or evenings.

D. Training will be provided in a series of classes to operations personnel to review all aspects of operation and maintenance of the system. Follow-up sessions to better enhance the operator's ability to expand or maximize the system will be made available.

E. The system training will include 1 days or 8 hours of technical training covering the explanation of the system, including documentation, configuration, interfacing and diagnostics. Provide training of the system operators and maintenance personnel as follows:

F. System Overview: Explanation of system includes documentation, configuration, interfacing and basic diagnosis.

G. Operator Training General: Basic training in the use of system devices including powering, timing and general operation of overall system.

H. Operator Training Specific: Advanced training in use of system devices including video on demand and ad insertion equipment.

I. Where specified, training will be by manufacturer representatives.

J. Manufacturer training and commissioning is specified in this document. The Contractor will cover expenses such as flight, hotel, rental car, and meals and include them as part of the bid pricing.

END OF SECTION

Quantity	Manufacturer (or approved equal)	Model Number (or approved equal)	Description
DSP, Paging, Speakers			
2	QSC	PS-1600G	Q-SYS 16-Button Wall Mounted Page Station; Gooseneck (G)
1	QSC	TSC-80w-G2-BK	Q-SYS 8.0â€•PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
1	Belden	Data Patchbay - 24 Port	24 Port Data Patch with modular connectors per specifications.
1	Extreme Networks	Summit X440-G2-48p-10GE4	48 x 10/100/1000 port w/ POE+ & 4 x SFP ports
1	QSC	CX-Q 4K8	8-Channel 500W/CH Q-SYS Network Amplifier, Lo-Z, 70V, 100V direct drive, FlexAmpâ„¢, with Mic/line Inputs, 100-240v.
1	QSC	Core 110f	Unified Core with 24 local audio I/O channels, 128x128 network I/O channels, dual LAN ports, POTS and VoIP telephony, 16x16 GPIO, 16 next-generation AEC processors,
8	JBL	CONTROL 24CT	Control 24C with Transformer. For use on a 70.7V or 100V Distributed Line, Switchable Taps at 30W, 15W and 7.5W (Plus 3.7W at 70.7V only), No SonicGuard. Priced as Each, Packed as Pairs. Master Pack
10	JBL	CONTROL 26CT	Control 26C with Transformer. For use on a 70.7V or 100V Distributed Line, Switchable Taps at 60W, 30W and 15W (Plus 7.5W at 70.7V only), No SonicGuard. Priced as Each, Packed as Pairs. Master Pack
3	Placeholder	Placeholder	JBL Control 64P/T Compact Full-Range Pendant Loudspeaker

3	JBL	Control 25-1	5.25" Two-Way Vented Loudspeaker, InvisiballÂ® Installation System (plus U-bracket attachment points). 60 Hz - 20 kHz Frequency Range. 100 Watts Cont. Pink Noise Power Handling (400W peak) at 8 ohms plus 70V/100V taps at 30W, 15W, 7.5W (& 3.7W at 70V only). Woven Fiberglass Woofer. Black or white (-WH). Priced as Each, Packed as Pairs.
2	JBL	CONTROL 28-1	8" Two-Way Vented Loudspeaker, InvisiballÂ® Installation System (plus U-bracket attachment points). 45 Hz - 20 kHz Frequency Range. 120 Watts Cont. Pink Noise Power Handling (480W peak) at 8 ohms plus 70V/100V taps at 60W, 30W, 15W (& 7.5W at 70V only). Woven Fiberglass Woofer. Black or white (-WH). Priced as Each, Packed as Pairs.airs.
1	Middle Atlantic Products	DWR-35-26	35SP/26D WALLRACK BLACK
1	Middle Atlantic Products	PD-2415SC	SLIM PWR STRP,24OUT,15A,W/SRG
1	Middle Atlantic Products	PD-915RC-20	PD-915R W/20' POWER CORD
1	Middle Atlantic Products	UD3	3SP UTILITY DRAWER,BLACK
Room 101			
1	Tascam	BD-01U	BLU-RAY PLAYER
1	Barco	CX-30	Barco ClickShare CX-30
5	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
3	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
1	Extron	IN1808	Eight Input 4K/60 Seamless Presentation Switchers
1	Extron	HAE 100 4K	HDMI Audio De-Embedder

1	Extron	SSP 7.1	Surround Sound Processor
1	QSC	CX-Q 4K8	8-Channel 500W/CH Q-SYS Network Amplifier, Lo-Z, 70V, 100V direct drive, FlexAmpâ„¢, with Mic/line Inputs, 100-240v.
4	Vaddio	999-85100-000	CEILINGMIC SYSTEM- WHITE
1	Vaddio	999-8535-000	EasyUSB MicPOD I/O N/A
1	QSC	I/O-8 FLEX	Q-SYS I/O peripheral providing 8 individual, software-switchable Q-SYS Flex Channels (Mic/Line IP with +48v or Line Level OP). 8x8 GPIO, 1x RS232 and Audio-to-USB Bridging via USB Device Port. Single cable deployments using PoE+ with an Auxiliary DC power input. All mounting hardware included.
1	Placeholder	Placeholder	Tannoy iW 62S-WH
1	innovox	FP-H1 blk	Horizontal 1-chan. Video Display Loudspeaker (each)
4	Tannoy	VLS 15 (white)	VLS Series - Passive column speakers
1	QSC	TSC-116w-G2-BK	Q-SYS 11.6â€PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
1	Extreme Networks	Summit X440-G2-12p-10GE4	12 x 10/100/1000 ports w/ POE & 4x SFP Ports
2	QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72Â° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall Mount Bracket).
1	QSC	I/O USB Bridge	Q-SYS PoE bridging endpoint for AV-to-USB Bridging. Delivers driverless usb 2.0 connection. Includes dual LAN connections.
1	Absen	Nova VX4S	Video Processor
1	Absen	Custom A2715	Custom A2715 LED Display
1	Middle Atlantic Products	DWR-35-26	35SP/26D WALLRACK BLACK

1	Middle Atlantic Products	PD-2415SC	SLIM PWR STRP,24OUT,15A,W/SRG
1	Middle Atlantic Products	PD-915RC-20	PD-915R W/20' POWER CORD
1	Middle Atlantic Products	UD3	3SP UTILITY DRAWER,BLACK
1	Listen Technologies	LT-803-072-01	Stationary 3-Channel RF Transmitter (72 MHz)
1	Listen Technologies	LA-123	90 Degree Helical Antenna (72 MHz)
2	Placeholder	Placeholder	Listen Technologies LR-3200-072 BASIC DSP RF RECEIVER (72 MHZ)
2	Listen Technologies	LA-430	Intelligent Ear Phone/Neck Loop Lanyard
2	Listen Technologies	LA-401	Universal Ear Speaker
1	Listen Technologies	LA-304	Assistive Listening Notification Signage Kit
2	Listen Technologies	LA-208-01	7.5 VDC Power/Charging Supply for RF Portable Products
Room 119			
1	Placeholder	Placeholder	Barco ClickShare CX-30
1	Extron	DTP HDMI 4K 230 Tx	HDMI Tx - 230 feet (70 m)
2	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
3	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
1	Placeholder	Placeholder	Extron IN1804 DI/DO Four Input 4K/60 Scaler, DTP2 I/O
1	Shure	MXA910W	24" X 24" or 603.8mm x 603.8mm (U.S.) Ceiling Array Microphone with Shure IntelliMix DSP Suite, White
1	QSC	TSC-116w-G2-BK	Q-SYS 11.6â€PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.

1	QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72Â° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall Mount Bracket).
1	QSC	I/O USB Bridge	Q-SYS PoE bridging endpoint for AV-to-USB Bridging. Delivers driverless usb 2.0 connection. Includes dual LAN connections.
1	LG Commercial	86UH5E-B	H5E Series - 86" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-Large
Conf 118,123,124,126,128			
5	QSC	TSC-55w-G2-BK	Q-SYS 5.5â€PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
5	Barco	CX-30	Wireless Presentation Device with (2) USB pucks.
5	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
5	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
4	LG Commercial	65UH5E-B	H5E Series - 65" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
4	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large
1	LG Commercial	75UH5E-B	H5E Series - 86" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-Large

Conf 125,127			
2	LG Commercial	55UH5E-B	H5E Series - 55" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
2	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large
2	custom	HDMI Wall Panel	Custom wall panel with HDMI input and HDMI cable to display or projector
2	QSC	TSC-55w-G2-BK	Q-SYS 5.5â€PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
Room 100			
1	Placeholder	Placeholder	BrightSign XT244 Standard I/O Player
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-Large
1	LG Commercial	75UH5E-B	H5E Series - 75" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
Room 129			
1	Placeholder	Placeholder	BrightSign XT244 Standard I/O Player
1	custom	HDMI Wall Panel	Custom wall panel with HDMI input and HDMI cable to display or projector
1	LG Commercial	65UH5E-B	H5E Series - 65" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External Speaker Out
1	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large

Quantity	Manufacturer	Model Number	Description
DSP, Paging, Speakers			
2	QSC	PS-1600G	Q-SYS 16-Button Wall Mounted Page Station; Gooseneck (G)
1	QSC	TSC-80w-G2-BK	Q-SYS 8.0â€ PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power
1	Belden	Data Patchbay - 24 Port	24 Port Data Patch with modular connectors per specifications.
1	Extreme Networks	Summit X440-G2-48p-10GE4	48 x 10/100/1000 port w/ POE+ & 4 x SFP ports
1	QSC	CX-Q 4K8	8-Channel 500W/CH Q-SYS Network Amplifier, Lo-Z, 70V, 100V direct drive, FlexAmpâ„¢,
1	QSC	Core 110f	Unified Core with 24 local audio I/O channels, 128x128 network I/O channels, dual LAN ports, POTS and VoIP telephony, 16x16 GPIO, 16 next-generation AEC processors,
8	JBL	CONTROL 24CT	Control 24C with Transformer. For use on a 70.7V or 100V Distributed Line, Switchable Taps at 30W, 15W and 7.5W (Plus 3.7W at 70.7V only), No SonicGuard. Priced as Each, Packed as Pairs. Master Pack
10	JBL	CONTROL 26CT	Control 26C with Transformer. For use on a 70.7V or 100V Distributed Line, Switchable Taps at 60W, 30W and 15W (Plus 7.5W at 70.7V only), No SonicGuard. Priced as Each, Packed as Pairs. Master Pack
3	Placeholder	Placeholder	JBL Control 64P/T Compact Full-Range Pendant Loudspeaker
3	JBL	Control 25-1	5.25" Two-Way Vented Loudspeaker, InvisiballÂ® Installation System (plus U-bracket attachment points). 60 Hz - 20 kHz Frequency Range. 100 Watts Cont. Pink Noise Power Handling (400W peak) at 8 ohms plus 70V/100V taps at 30W, 15W, 7.5W (& 3.7W at 70V only). Woven Fiberglass Woofer.

2	JBL	CONTROL 28-1	8" Two-Way Vented Loudspeaker, InvisiballÂ® Installation System (plus U-bracket attachment points). 45 Hz - 20 kHz Frequency Range. 120 Watts Cont. Pink Noise Power Handling (480W peak) at 8 ohms plus 70V/100V taps at 60W, 30W, 15W (& 7.5W at 70V only). Woven Fiberglass Woofer. Black or white (-WH) Pairs have Ferrite Backs
1	Middle Atlantic Products	DWR-35-26	35SP/26D WALLRACK BLACK
1	Middle Atlantic Products	PD-2415SC	SLIM PWR
1	Middle Atlantic Products	PD-915RC-20	PD-915R W/20' POWER CORD
1	Middle Atlantic Products	UD3	3SP UTILITY DRAWER,BLACK

Room 101			
1	Tascam	BD-01U	BLU-RAY PLAYER
1	Barco	CX-30	Barco ClickShare CX-30
5	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
3	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
1	Extron	IN1808	Eight Input 4K/60 Seamless Presentation Switchers
1	Extron	HAE 100 4K	HDMI Audio De-Embedder
1	Extron	SSP 7.1	Surround Sound Processor
1	QSC	CX-Q 4K8	8-Channel 500W/CH Q-SYS Network Amplifier, Lo-Z, 70V, 100V direct drive, FlexAmpâ„¢, with Mic/line Inputs, 100-240v.
4	Vaddio	999-85100-000	CEILINGMIC SYSTEM- WHITE
1	Vaddio	999-8535-000	EasyUSB MicPOD I/O N/A
1	QSC	I/O-8 FLEX	Q-SYS I/O peripheral providing 8 individual, software-switchable Q-SYS Flex Channels (Mic/Line IP with +48v or Line Level OP). 8x8 GPIO, 1x RS232 and Audio-to-USB Bridging via USB Device Port. Single cable deployments using PoE+ with an Auxiliary DC power input. All
1	Placeholder	Placeholder	Tannoy iW 62S-WH
1	innovox	FP-H1 blk	Horizontal 1-chan. Video Display Loudspeaker (each)
4	Tannoy	VLS 15 (white)	VLS Series - Passive column speakers

1	QSC	TSC-116w-G2-BK	Q-SYS 11.6â€ PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
1	Extreme Networks	Summit X440-G2-12p-10GE4	12 x 10/100/1000 ports w/ POE & 4x SFP Ports
2	QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72Â° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall Mount Bracket).
1	QSC	I/O USB Bridge	Q-SYS PoE bridging endpoint for AV-to-USB Bridging. Delivers driverless usb 2.0 connection. Includes dual LAN connections.
1	Absen	Nova VX4S	Video Processor
1	Absen	Custom A2715	Custom A2715 LED Display
1	Middle Atlantic Products	DWR-35-26	35SP/26D WALLRACK BLACK
1	Middle Atlantic Products	PD-2415SC	SLIM PWR STRP,24OUT,15A,W/SRG
1	Middle Atlantic Products	PD-915RC-20	PD-915R W/20' POWER CORD
1	Middle Atlantic Products	UD3	3SP UTILITY DRAWER,BLACK
1	Listen Technologies	LT-803-072-01	Stationary 3-Channel RF Transmitter (72 MHz)
1	Listen Technologies	LA-123	90 Degree Helical Antenna (72 MHz)
2	Placeholder	Placeholder	Listen Technologies LR-3200-072 BASIC DSP RF RECEIVER (72 MHZ)
2	Listen Technologies	LA-430	Intelligent Ear Phone/Neck Loop
2	Listen Technologies	LA-401	Universal Ear Speaker
1	Listen Technologies	LA-304	Assistive Listening Notification
2	Listen Technologies	LA-208-01	7.5 VDC Power/Charging Supply for RF Portable Products
Room 119			
1	Placeholder	Placeholder	Barco ClickShare CX-30
1	Extron	DTP HDMI 4K 230 Tx	HDMI Tx - 230 feet (70 m)
2	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
3	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
1	Placeholder	Placeholder	Extron IN1804 DI/DO Four Input 4K/60 Scaler, DTP2 I/O

1	Shure	MXA910W	24" X 24" or 603.8mm x 603.8mm (U.S.) Ceiling Array Microphone with Shure IntelliMix DSP Suite, White
1	QSC	TSC-116w-G2-BK	Q-SYS 11.6â€ PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
1	QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72Â° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall Mount Bracket).
1	QSC	I/O USB Bridge	Q-SYS PoE bridging endpoint for AV-to-USB Bridging. Delivers driverless usb 2.0 connection. Includes dual LAN connections.
1	LG Commercial	86UH5E-B	H5E Series - 86" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-
Conf 118,123,124,126,128			
5	QSC	TSC-55w-G2-BK	Q-SYS 5.5â€ PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.
5	Barco	CX-30	Wireless Presentation Device with (2) USB pucks.
5	Extron	DTP T HWP 4K 231 D - 60-1421-12	DTP Transmitter for HDMI - Decora Wallplate, Black - 230 feet (70 m)
5	Extron	DTP HDMI 4K 230 Rx - 60-1271-13	HDMI Twisted Pair Receiver - 230 feet (70 m)
4	LG Commercial	65UH5E-B	H5E Series - 65" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External
4	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large
1	LG Commercial	75UH5E-B	H5E Series - 86" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-
Conf 125,127			

2	LG Commercial	55UH5E-B	H5E Series - 55" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External
2	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large
2	custom	HDMI Wall Panel	Custom wall panel with HDMI input and HDMI cable to display or
2	QSC	TSC-55w-G2-BK	Q-SYS 5.5â€ PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.

Room 100			
1	Placeholder	Placeholder	BrightSign XT244 Standard I/O
1	Chief Manufacturing	XTM1U	Micro-Adjust Tilt Wall Mount X-
1	LG Commercial	75UH5E-B	H5E Series - 75" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External

Room 129			
1	Placeholder	Placeholder	BrightSign XT244 Standard I/O
1	custom	HDMI Wall Panel	Custom wall panel with HDMI input and HDMI cable to display or
1	LG Commercial	65UH5E-B	H5E Series - 65" LED display - 4K, HDMI(3)/DP/DVI-D/USB 2.0(2)/ RS232C/ RJ45/ Audio/ IR/ External
1	Chief Manufacturing	LTM1U	Micro-Adjust Tilt Wall Mount Large

Section 27 51 24

ASSISTIVE LISTENING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, 26, 28 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section274116 – Audio Video Systems.
2. Section 275116 – Public Address Systems.

1.2 SUMMARY

A. Section contains criteria for Assistive Listening Devices.

B. The Assistive Listening System shall comply with requirements of California Building Code Section 1104B, Accessibility for Group A Occupancies.

1.3 CODES, STANDARDS AND REFERENCES

A. ANSI/NFPA 70: National Electrical Code (NEC), with California Amendments (CEC).

B. ANSI/IEEE C2-97: National Electrical Safety Code (NESC).

C. ANSI/IEEE Std. 1100-1999: Recommended Practice for Powering and Grounding Sensitive Electronic Equipment in Industrial and Commercial Power System.

D. CBC: California Building Code 2007.

E. CBC Section 1104B: Accessibility for Group A Occupancies.

F. EIA/TIA-607: Grounding and Bonding for Communications.

G. Occupational Safety and Health Administration (OSHA) 29 CFR 1910.7: OSHA Occupational Safety and Health Standards.

H. Underwriter Laboratories, UL 467: Grounding and Bonding Equipment.

I. Underwriter Laboratories, UL 486A: Wire Connectors and Soldering Lugs for use with Copper Conductors.

1.4 PERFORMANCE REQUIREMENTS

A. The Community Room shall provide assistive listening systems for persons with hearing impairments as provided in this section.

B. The minimum number of receivers to be provided shall be equal to 4 percent of the total number of seats, but in no case less than two.

C. Types of assistive listening systems include, but are not limited to, audio-induction loops, radio frequency systems (AM or FM), and infrared transmission.

D. If the assistive listening system provided is limited to specific areas or seats, then such areas or seats shall be within a 50-foot viewing distance of the performing area.

E. A sign shall be posted in a prominent place (for example, a customer service counter, ticket booth, or assembly area entrance) indicating the availability of assistive listening devices. The sign complying with California Building Code (CBC). Section 117B.5.1, Items 2 and 3 shall include the International Symbol of Access for Hearing Loss complying with Figure 11B-14C and include wording that states, “Assistive Listening System Available”.

F. Permanently installed assistive listening systems are required in areas if (1) they accommodate at least 50 persons or if they have audio-amplification systems, and (2) they have fixed seating.

G. If portable assistive listening systems are used for conference or meeting rooms, the system may serve more than one room. An adequate number of electrical outlets or other supplementary wiring necessary to support a portable assistive listening system shall be provided.

1.5 QUALITY ASSURANCE

A. The Contractor and/or Vendors supplying all or parts of the work on site shall provide Project references, which substantiate the Contractor/Vendor’s previous experience as noted herein.

B. The Contractor personnel managing the installation and providing the system commissioning and test verification must have prior experience for similar types of Projects.

C. The installing Contractor shall have previous experience in the provision and setting up of commercial sound systems.

1.6 WORK INCLUDED

A. Work under this section shall include all labor, materials, tools, transportation services, supervision, coordination, etc., necessary to complete the installation of the Assistive Listening.

1. Provide the following Manufacturers items or equivalents:

a. Hearing/Listening Assist Systems.

2. Provide the following services:

a. Verification of dimensions and conditions at the job site.
b. System Installation in accordance with Contract documents, Manufacturer's recommendations, and applicable code requirements.
c. System connection to a dedicated AC circuit with an isolated ground.

B. On-Site Assistance

1. Contractor shall provide on-site assistance in adjusting sound levels, re-setting transformer taps, and adjusting controls to meet occupancy conditions. Provide up to three on-site assistance visits within one year of Substantial Completion.

1.7 SUBMITTALS

A. In addition to all requirements as noted in the Contract documents, all proposals shall be submitted with the following information.

B. Material List

1. Provide a complete listing of all major components required for complete and fully functional Assistive Listening Device System.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by Otojoy or approved equivalent.

2.2 EQUIPMENT AND MATERIALS

A. Hearing Assist System: The District is required by ADA legislation to provide hearing assist systems where the public may attend events. The Cafeteria/auditorium/multi-purpose room represents such a space. The Contractor shall provide the following for the Cafeteria/auditorium/multi-purpose room, and mount the transmitter in an equipment cabinet.

1. The hearing assist system shall be FM type and deployed to provide noise free coverage of the Cafeteria/auditorium/multi-purpose room seating area. The Contractor shall provide quantity of receivers per plans. The system shall include the following features:

   a. Field Strength: Maximum 8000 micro-volts per meter at 30 meters.
   b. Transmitter Input: Balanced bridging with a nominal level of 0.03 to 1.0 volt RMS.
   c. An automatic gain control shall minimize overload and distortion due to excess-signal input.
   d. Antenna Type: 75-ohm, half-wave, coaxial. Coordinate antenna location with District's representative.
   e. Receiver Type: 72-76 MHz band and include earphone and belt clip-carrying case. Receiver shall be battery powered and have approximately a 15-hour life when used with alkaline batteries.

2.3 EXTRA MATERIALS

A. Furnish extra materials described below that match products provided and installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. A minimum of sixteen (16) receivers with carrying/charger cases shall be provided. Provide twenty (20) spare ear bud covers.

PART 3 - EXECUTION

3.1 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Section 260533 - Raceway and Boxes for Electrical Systems.

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding Manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 INSTALLATION OF RACEWAYS

A. Comply with requirements in Section 260533 - Raceway and Boxes for Electrical Systems for installation of conduits and wireways.

B. Install manufactured conduit sweeps and long-radius elbows whenever possible.

3.3 INSTALLATION

A. Comply with CBC Section 1104B.2 for installation of Assistive Listening System.

B. Work under this Contract shall be performed in accordance with acknowledged industry and professional standards and practices, existing building conditions, and as specified herein. Provide and install all material, devices, components, and equipment for a complete and operational system.

C. Verify all field conditions. Coordinate all efforts with those of related trades.

3.4 TESTS

A. Engage an independent qualified testing and inspecting agency to perform the following field tests and inspections.

B. Perform and document Sound System tests and adjustments.

C. All tests, adjustments, and system demonstration shall be performed after prior notification of the Architect and the District’s operating personnel.

D. Provide instruction for District’s designated operating personnel.

E. Provide original and four copies of test reports, and operation manuals. Provide as-built documentation of installed system.

END OF SECTION 275124

SECTION 28 05 14

CABLING FOR SECURITY SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All requirements under Instructions to Bidders, General Conditions, Supplementary Conditions, Special Conditions, Division One (1), Technical Specifications, Referenced Documents or Practices and any Addenda of these Specifications shall be a part of this section. The Contractor is responsible to be thoroughly familiar with all its contents as to requirements which affect this Division or Section. Ensure that all items are furnished in accordance with National standards.

1.2 REFERENCE STANDARDS

A. Design, manufacture, test, and install security cabling networks per manufacturer's requirements and in accordance with state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:

B. ANSI/TIA/EIA Standards

1. ANSI/TIA/EIA-568-B -- Commercial Building Telecommunications Cabling.
2. ANSI/TIA/EIA-569-A -- Commercial Building Standard for Telecommunications Pathways and Spaces.
3. ANSI/TIA/EIA-606-A -- The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
4. ANSI/TIA/EIA-607 -- Commercial Building Grounding and Bonding Requirements for Telecommunications.
5. ANSI/TIA/EIA-758 – Customer-Owned Outside Plant Telecommunications Cabling Standard.
6. ANSI/TIA/EIA TSB-67 -- Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems.
7. ANSI/TIA/EIA TSB-75 -- Additional Horizontal Cabling Practices for Open Offices.

C. OTHER STANDARDS

1. NFPA-780 -- For the Installation of Lightning Protection Systems
2. NFPA-70 -- National Electrical Code
3. NESC -- National Electrical Safety Code
4. National Fire Protection Association (N.F.P.A.).
5. American National Safety Institute (A.N.S.I.).
6. National Electrical Code (N.E.C.).
7. Underwriters Laboratories (U.L.)
8. Electronics Industries Association (E.I.A).
9. National Cable Television Association (N.C.T.A.)

10. International Telecommunications Union (I.T.U.-T.)

1.3 RESPONSIBILITY AND RELATED WORK

A. The work covered by these Specifications includes the design and installation for the systems described herein and on the Security drawings (19-series) including all labor necessary to perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and-complete such construction.

B. Comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the Construction Manager.

C. The Contractor will provide and install all cabling infrastructure for cameras, card readers, request to exists, hold-up alarms, cabling, and other items as described within this section.

D. This section does not include the following, which is contained in other Division 26 specification sections:

1. Provision and installation of all AC power circuits, outlets, power panels and interconnection of power to the equipment racks.

1.4 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Refer to installation guidelines in the design drawings and the following Sections:

1. 28 05 29 – Conduits and Back Boxes for Security Systems
2. DT-Series Data/Technology Systems Drawings

1.5 SUBMITTALS

A. Scope of Work: Vendor’s narrative of services that will be provided to be submitted to Architect before start of any work. Include a time-line, information of on-site techs including their qualifications, and acceptance of this document and all that it entails and references.

B. Product Data: Manufacturer's descriptive literature for each type wire/cable to be used on the project indicating compliance with specified requirements. Any requests for substitutions of materials from manufacturers not represented in the design documents must be submitted and approved prior to submitting the Product data. Only specified or accepted manufacturers or suppliers products shall appear in the Product Data Submittal.

C. Miscellaneous Submittals:

1. Bill of materials, noting long lead time items.
2. Project schedule including all major work components that materially affect any other work on the project.

D. Shop Drawings:

1. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. Perform no portion of the work requiring submittal and review of shop drawings, product data, or samples until the respective submittal has been approved. Such work shall be in accordance with approved submittals.
2. Shop drawings shall show cable routing and the locations where terminal blocks, splices, telecommunication outlets, furniture feed points are to be installed.
3. Provide schematic and field wiring diagrams.
4. Computer generated shop drawings shall show in plan view the locations where cables are to be routed and plans for excess cable lengths to be left for others to terminate at both ends.
5. By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents.
6. The Consultant's approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents. The contractor shall continue to be responsible for deviations from requirements of the original contract documents that are issued in writing as contract change directives (i.e. change orders, RFIs, CCDs, etc.)
7. The Consultant's review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The Consultant's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The Consultant's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
8. Illegible submittals will not be checked by the Consultant.
9. Note: Consultants Autocad V2018 drawings are available to selected contractor, on disk, at no charge upon request. Previous Autocad versions or DXF files may be provided for a fee.

E. Project record drawings:

1. Contractor shall provide as-built documentation of complete cable installations by floor.
2. Submit project record drawings at conclusion of the project
3. All "as-built" drawings to be provided both in ACAD (2013 or later) and PDF.

1.6 GUARANTEE

A. Parts, labor, and travel to replace defective materials and workmanship for a period of one year after final acceptance. The Contractor shall provide a warranty of no less than five years directly to the owner. The direct warranty shall cover all parts of the structured cabling system installed under contract. It is The Contractor's responsibility to acquire all necessary training

and certifications to be eligible for installation of cabling systems under these warranties. At job completion, a certificate of warranty shall be provided to the owner.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

B. Provide products that meet or exceed TIA/EIA standards and all other standards outlined in section 1.2.

C. The contractor shall be responsible for safekeeping own materials and subcontractor's property, such as equipment and materials, on the job site. The owner assumes no responsibility for protection of above-named property against fire, theft, and environmental conditions.

2.2 CABLE AND CONTROL WIRING & TERMINATIONS

A. Electrical conductors installed under this contract, except where otherwise specified, shall be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper.

B. Refer to section 1.3 for Responsibility and Related Work.

C. Refer to drawing DT501 through DT504 for cable and accommodation details.

D. Cabling for security devices shall be routed to the IDF Closet specified in the schedule on drawing DT601 and DT602.

2.3 VIDEO SURVEILLANCE CAMERA VIDEO/DATA CABLE

A. Data Cabling for video surveillance cameras will be provided under specification section 271500 and is not part of the 280514 scope of work.

2.4 CARD READER DATA CABLE

A. General: shielded, twisted, 8-conductor, 22 AWG stranded copper conductors, twisted, shielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.5 DOOR STATUS SWITCH CABLE

A. General: Unshielded, Jacketed, 2-conductor, 18 AWG stranded copper conductors, twisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.6 DOOR REQUEST-TO-EXIT CABLE

A. General: Unshielded, Jacketed, 4-conductor, 18 AWG stranded copper conductors, twisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.7 MOTION SENSOR CABLE

A. General: Unshielded, Jacketed, 6-conductor, 18 AWG stranded copper conductors, twisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.8 INTRUSION DETECTION SYSTEM CONTROL KEYPAD DATA CABLE

A. General: shielded, 4-conductor, 18 AWG stranded copper conductors, untwisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.9 INTRUSION DETECTION SYSTEM TRANSCEIVER / BUS DATA CABLE

A. General: shielded, 4-conductor, 18 AWG stranded copper conductors, untwisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.10 HARDWIRED PANIC BUTTON CABLE

A. General: Jacketed, 4-conductor, 18 AWG stranded copper conductors, twisted, unshielded.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.11 ELECTRIFIED MORTISE LOCK OR ELECTRIC STRIK POWER CABLE

A. General: Unshielded, Jacketed, 2-conductor, 16 AWG stranded copper conductors.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.12 ELECTRIC LATCH RETRACTION EXIT DEVICE POWER CABLE

A. General: Unshielded, Jacketed, 2-conductor, 14 AWG stranded copper conductors.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.13 ADA ACTUATOR SIGNAL CABLE

A. General: Unshielded, Jacketed, 2-conductor, 18 AWG stranded copper conductors.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

2.14 ELECTRONIC ASSET SURVEILLANCE RFID GATE POWER CABLE

A. General: Unshielded, Jacketed, 2-conductor, 14 AWG stranded copper conductors.

B. The installation contractor is required to use plenum rated cable in all plenum areas and riser rated cable in riser and/or non-plenum areas. If it is unclear what spaces are considered plenum, it is the contractor's responsibility to inquire with the owner, architect, engineer or provincial officer(s).

C. Acceptable Manufacturer: Belden, Gepco, West Penn, Windy City or other as approved by owner.

D. Provide products of manufacturers in compliance with requirements or provide alternative products to be approved by owner.

PART 3 - EXECUTION

3.1 GENERAL

A. The contractor shall install each cable as an uninterrupted conductor section between the designated termination points, unless otherwise directed by the cable installation specifications. There shall be no splices or mechanical couplers installed between the cable points of origin and termination except as shown on the drawings and/or specified herein.

B. Unless otherwise noted, quantities of blocks, racks, splice boxes and patch panels, etc. shown on the Drawings are illustrative only and are meant to indicate the general configuration of the work. The Contractor is responsible for providing the correct quantities of blocks, racks, patch panels, connectors, etc. necessary to terminate, cross connect and patch the volume of cable described in the system specification sections and on the Drawings. Where less than all of the capacity of a terminal block, patch panel, etc. is used to terminate cables, the Contractor shall provide the Owner with the number of connecting blocks, coupling panels, couplings, etc to completely fill out the terminal block, patch panel, etc.

C. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.

D. The process of acceptance testing the System may necessitate moving and adjusting or re-terminating certain component parts - e.g., fiber patch bays. Provide for and perform such adjustments without claim for additional payment.

E. Cover edges of cable pass-through holes in chassis, racks, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting.

3.2 STAFFING

A. The Contractor shall keep a qualified named foreman on-site and in charge of the work at all times. Such foreman shall be approved by the Construction Manager and will be replaced if the Construction Manager finds such foreman to be unsatisfactory.

B. Use craftsmen and installers possessing the necessary licenses and permits and skilled in their trade for all work.

C. The Contractor shall use only skilled, experienced and reliable workers and shall immediately discontinue the services of anyone employed on this project upon written request of the Owner.

D. All crafts personnel shall be fully licensed and qualified to perform the work designated herein and be knowledgeable of the following:

1. Color coding of standard International telephone cables.
2. Bonding and grounding of shields.
3. Testing conductors for electrical continuity and compliance with specifications set forth in this document.
4. Termination of cables on specified termination, patching, and "cross-connect" hardware.

E. Contractor is responsible for providing installers with the required tools to perform each activity. Installers shall be adequately trained in the use of all tools prior to beginning work. Tools must be maintained in good working order. The Construction Manager reserves the right to review the tool lists and tool maintenance procedure of the Contractor. Tools deemed unserviceable by the Construction Manager shall be replaced immediately.

3.3 PROTECTION OF WORK AND PROPERTY

A. The Contractor shall assume full responsibility for any damage or defacement they cause to any other trades finished work and shall remedy any such damage or defacement at their own expense as required as soon as possible.

B. The Contractor shall perform daily clean-up of their own debris in their work area. All debris shall be placed in the containers and/or locations as directed by the General Contractor.

C. Coordinate storage and work space requirements with the General Contractor.

3.4 PRE-INSTALLATION SITE SURVEY

A. Prior to the start of systems installation, meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the general contractor shall be necessary to plan the crucial scheduled completions of the equipment rooms and telecommunications closets.

3.5 INSTALLATION

A. Exercise care in wiring; damaged fiber, cables or equipment shall not be accepted.

B. Leave neatly bundled and positioned service loops of 25' or longer length on both ends.

C. All wiring in publicly accessible spaces shall be concealed in walls. Alternatively, surface mounted raceway systems may be used. The method of wiring shall be proposed to the owner and approval must be granted prior to proceeding with the work.

D. Protect all cable from physical damage. Maintain proper radius per manufacturer's requirements. Support riser cable uniformly per manufacturer's requirements to prevent undue stress on cable or bends.

E. Unless otherwise noted, all cables shall be routed through the building cable tray/conduit system. Refer to the Data drawings for the layout of the conduits and cable tray.

F. All backbone cables shall be CMR, MPR, OFNR, or OFCR rated. Cables suitable for use in air plenums, and which meet the electrical/transmission specifications, are also acceptable for riser applications.

G. Cables routed entirely within individual telecommunications rooms and not within air plenums shall be CM, CMG, MP, MPG, OFN, OFNG, OFCG or OFG rated as a minimum. Cables suitable for use in air plenums and riser applications, and which meet the electrical/transmission specifications, are acceptable substitutes.

H. If at any time during the job the cable tag becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a duplicate pre-printed cable tag at the Contractor's expense.

I. Twisted pair metallic cables: Cable pair twists of Category 6 Cable shall be maintained up to within 1" of the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

J. Twisted pair metallic cables: Do not bend Category 6 station cables to a radius of less than eight (8) times the cable diameter.

K. Cross-connect wire: Cable pair twists shall be maintained as close as practicable to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

L. Cable tags shall be placed as per these specifications. Tags containing a unique cable ID designator shall be placed on both ends of all cables, 6 inches from the connector and/or terminal block. Also label all backbone cables passing through telecommunications rooms.

M. Location and placement of termination blocks, splice closures, splices and other distribution hardware shall be as shown on the Drawings or defined in the cable schedules.

3.6 GROUNDING

A. Bond all metal conduits, racks and panels with 6 AWG green insulated stranded cable and run all grounds to the dedicated Communications Grounding Bus and tie in. If a grounding bus has not been established, or there is only a single closet in the building, run ground to nearest electrical distribution panel. Terminate onto ground lug by a qualified licensed electrician.

B. All grounding shall comply with ANSI/TIA/EIA 607 Grounding and Bonding Standard.

3.7 TESTING

A. Test all CAT 6 data cables with an approved Qualification Tester (or Certification Tester) to ensure that all runs meet or exceed the required network performance. At a minimum, the tester should test for the following:

1. Length
2. Graphical Wire Mapping
3. Network Capacity
4. Insertion Loss
5. Cross Talk
6. Noise
7. Open/Shorts
8. PoE Detection

B. Recommended Cat6 test equipment (obtain approval of Construction Manager and Consultant prior to using substitute test equipment):

1. Fluke CableIQ
2. Ideal SignalTek II
3. ByteBrothers Low Voltage Pro

C. Test all other security cabling for opens, shorts and proper termination.

D. In the event that test results are not satisfactory, the contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests which disclosed faulty or defective material, equipment, or installation method, and shall perform additional tests as the Consultant deems necessary.

3.8 WARRANTY

A. Upon completion of the testing, The Contractor shall issue to the Construction Manager a letter of certification attesting to the fact that he has tested and adjusted the system, that all components are properly installed and free of defects, and that the system is in compliance with this specification. All labor and materials during the warranty period shall be provided at no expense to the Construction Manager.

END OF SECTION

SECTION 28 05 29

CONDUITS AND BACK BOXES FOR SECURITY SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The work covered by these Specifications includes the design and installation of conduit and backboxes for the surveillance, electronic access control and intrusion detection systems described herein and on the Data/Technology drawings (DT) including all labor necessary to perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and-complete such construction.

B. Coordinate scheduling of work with the General Contractor.

C. Comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the General Contractor.

D. Furnish and install a complete structured cabling hanger, support and containment system including all cable trays, j-hooks, channels, conduits, backboxes, etc. as indicated on the drawings, specified or as otherwise required.

E. Cable runs of 18 or more cables are required to be supported by cable trays.

F. Note that the drawings are conceptual. All boxes, fittings, couplings, etc are not necessarily shown. Provide all conduits, fittings, pull boxes, cable support hangers, etc. necessary to meet the requirements of this specification and the design as communicated in the Security Systems drawings as well as comply with the NEC.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Refer to the following design drawings:

1. DT-series Data/Technology Systems Drawings

B. Refer to the following documents for coordination with other trades:

1. Specification Section 27 05 28 – Pathways for Communication Systems

PART 2 - PRODUCTS

2.1 CABLE TRAYS

A. Where possible, Security System cables shall be run through the communications cable tray. Cable trays shall be provided by the 27 05 28 contractor. Refer to 27 05 28 specification and DT-series data drawings for further information.

2.2 CONDUITS

A. Cabling for security devices, provided under specification section 28 05 14, shall be routed to the IDF Closet specified in the schedule on drawing DT601 and DT602 via conduit provided under this section and/or the communications cable tray where possible. Conduit shall be provided by the 27 05 29 contractor to ensure an unobstructed pathway from the security device to the specified IDF or a communications cable tray accessing to the specified IDF.

B. Provide and install Security Systems conduit as specified in DT-Series Drawings DT501 through DT504.

C. Conduits shall be provided from all Security Systems wall boxes, floor boxes and ceiling boxes to the nearest accessible ceiling.

D. Conduits shall be provided through walls and across inaccessible ceilings to ensure an unobstructed pathway to the specified IDF or communications cable tray.

E. Conduits shall be installed per Raceway Specification Section 28 05 29 and project guidelines and instruction for installation of conduit of this specification except as noted. The sizes of conduits shall be as shown on the drawings, minimum size is .75" unless otherwise noted. All conduits shall be reamed and furnished with insulation and/or grounded bushings as required.

F. Flexible Steel Conduit

1. Flexible steel conduits are not acceptable for Security Systems installations.

G. Rigid and Intermediate Metal Conduit (IMC)

1. Conduit shall be steel, hot dipped zinc galvanized (min. .0008 in thick) inside and out, with circular cross section, uniform wall thickness, continuously welded seams and chamfered threaded ends. Conduit shall be furnished in ten foot standard lengths.

H. Electrical Metallic Tubing (EMT)

1. EMT shall be zinc galvanized (min. .0008 in thick) inside and out, with circular cross section, uniform wall thickness and continuously welded seams. EMT shall be furnished in ten foot standard lengths.

I. Electrical Non-Metallic Tubing (ENT)

1. ENT for use in buildings in accordance with Article 362 of the NEC. ENT shall be provided in standard coil lengths.

J. Liquid-Tight Flexible Steel Conduit

1. Conduit shall be hot dipped zinc galvanized inside and out and made from one continuous length of high grade steel strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.
2. Conduit shall have a continuous PVC jacket enclosing it.

K. PVC Conduit

1. PVC conduit shall be rigid non-metallic Schedule 40 heavy wall.

2.3 BACK BOXES

A. Provide and install Security Systems backboxes as specified in DT-Series Drawings DT501 through DT504.

2.4 PULL BOXES AND FITTINGS

A. Pull boxes shall be constructed of code gauge steel, etched, primed and shall have rust resistant ANSI 61 gray finish and be NEMA 1 construction with screw covers unless noted otherwise. For conduits 1-1/4" and larger terminating in a pull box, the minimum length of pull box shall be 8 times the diameter of the largest conduit terminating in the pull box. Splice boxes shall be sized as per EIA/TIA-569A Table 5.2-3.

B. Pull boxes shall be placed in straight sections of conduit runs and should not be used in lieu of a bend without approval of the Engineer. Pull boxes and/or splice boxes shall be installed in readily accessible locations. Where boxes are installed above suspended ceilings, they shall be located immediately above the suspended ceiling or the ceiling shall have a suitably marked and hinged panel or equivalent to facilitate direct access to the pull box.

C. Location and sizes of pull boxes and splice boxes shall meet the approval of the Owner and Engineer. Condulete type fittings (e.g. LB's, etc.) shall not be used in lieu of pull boxes or bends.

D. Exposed pull boxes in public areas shall be provided with tamperproof screws.

E. Boxes shall be provided without knockouts and shall not have any open or unused knockouts or other openings.

F. Pull boxes for indoor wet or damp locations shall be NEMA 3R Rated with stainless steel screws unless otherwise indicated. Pull boxes 12” x 12” or larger will have hinged covers unless otherwise indicated.

G. Pull boxes for outdoor locations shall be NEMA 4X Rated stainless steel continuous hinges, door clamps and a hasp unless otherwise indicated.

2.5 CONDUIT FITTINGS

A. All rigid, IMC and EMT fittings shall be galvanized malleable iron or steel. Connectors and couplings shall be threaded, setscrew or compression type, concrete-tight.

B. Conduit bodies shall be malleable iron, threaded type. Provide neoprene cover gaskets for conduit body covers exposed to the weather.

C. Expansion fittings shall be O-Z/Gedney Type "AX" for rigid metal conduit and Type "TX" for electrical metallic tubing. For intermediate metal conduit applications, a 15 inch minimum length of rigid metal conduit shall be used with a Type "AX" expansion fitting. Provide O-Z/Gedney Type "BJ" bonding jumpers at all expansion fittings.

D. Rigid and IMC conduit bushings shall be of the insulated type with phenolic thermosetting insulation molded to a hot dipped galvanized malleable iron body of the threaded type.

E. EMT fittings shall be of the insulated throat type. Fittings larger than 2-1/2 inches shall have threaded bushings installed.

F. PVC conduit fittings shall be slip joint type.

G. All conduit sleeves will be fitted with “spillways” to maintain the bend radius of cables passing through the sleeve.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Where possible, Security Systems cables shall be run through the communications cable tray. Cable trays shall be provided by the 27 05 28 contractor. Refer to 27 05 28 specification and T-series data drawings for further information.

B. Conduits shall be provided from all Security Systems wall boxes, floor boxes and ceiling boxes to the nearest accessible ceiling.

C. Conduits shall be provided through walls and across inaccessible ceilings to ensure an unobstructed pathway to the communications cable tray.

D. Provide continuous conduits across exposed areas. Exposed conduits shall be installed parallel and perpendicular to nearby surfaces and structural members. Exposed conduits shall be painted to match the surrounding surfaces. Coordinate color with Architect. Paths for all exposed conduit runs shall approved by Architect prior to installation.

E. Conduits runs shall have a maximum of two 90° bends.

F. A polyethylene pull string shall be installed in all Security Systems conduits and a pull string will remain in all conduits when the cables under this contract are installed.

G. The Contractor shall furnish and install additional conduit and cable support hangers per specification as required to facilitate the Security Systems cabling installation. The minimum required installation is indicated on the Drawings.

H. The Contractor shall submit 30 days prior to commencement of installation or as otherwise directed for Owner and Engineer review and acceptance, drawings indicating cable tray, conduit or other raceway routing, size, cable fill, etc. as required to verify that the installation will meet all aspects of the Specification.

I. All power devices and power sources emit a given amount of radio frequency interference (RFI) and/or electro-magnetic interference (EMI). To reduce or eliminate the field effects of RFI/EMI on data traffic on a given cable channel, cable runs shall be kept at the maximum possible distance from such sources. Running cables through the center of the building can reduce the external interference effects of RFI/EMI in the cable tray. Open wiring and non-metallic raceway shall be routed a minimum of twelve (12") inches away from fluorescent fixtures. Special attention shall be given to the routing of such pathways away from lighting ballasts and high intensity discharge devices. The minimum separation distances between data/communication distribution pathways and power wiring of 480 Volts or less shall be per Table-3 herein.

TABLE-3

SEPARATION OF SECURITY SYSTEMS PATHWAYS FROM ≤480V POWER LINES

CONDITION	MINIMUM SEPARATION DISTANCE		
	< 2 kVA	2-5 kVA	> 5 kVA
Unshielded power lines or electrical equipment in proximity to open or nonmetal tel/comm pathways.	6 in	12 in	24 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to open or non-metallic tel/comm pathways	3 in	6 in	12 in
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit tel/comm pathway.	3 in	6 in	12 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit tel/comm pathway.	1/2 the trade Size of the larger conduit	3 in	6 in

J. Whenever possible, raceway routing paths shall follow the logical structure of the building (e.g. follow hallways, aisles and corridors). When rated walls must be breached, cables shall pass through pre-established EZ-Paths ganged together to equal the full capacity of the cable tray. Cables shall enter and/or exit areas at right angles to the structure. Route all Security Systems raceways parallel to or perpendicular to the building structure. No diagonal runs will be

permitted unless noted otherwise or pre-approved by the Owner and Engineer. Corridor crossovers shall be kept to a minimum.

K. When cables are supported on Panduit J-Pro cable Support System J-Hooks, Caddy brand “Cable-Cat” hangers or Engineer approved supports, 48" maximum spacing shall be maintained. A maximum of 17 cables shall be supported in a single hanger on 48" centers, no exceptions.

L. In no case will unsupported spans of greater than 48" be approved by the Engineer. For spans longer than 48", the Contractor shall provide cable tray, channel, ladder, conduit, wireway, messenger wire or other Engineer approved cable support.

M. Open unsupported spans between cable trays, conduit sleeves and trays, etc. shall not exceed 10” horizontally, 24” vertically. Provide “drop-out” supports spillways, and radius controls for changes in elevation as required.

N. Ancillary cable support devices shall not be attached to data/ telecommunications cable trays, channels, ladders, etc. (e.g. J-hooks to the cable tray) without the expressed written approval of the Owner and Engineer.

O. Restore fire rating and smoke stoppage integrity where all wireways, raceways and cable trays pierce walls, floors and ceilings by sealing with approved means

P. Conduit buried in concrete slab pours shall be full weight rigid galvanized steel or Carlon Schedule 40 PVC. All elbows, stub ups and conduit above ground shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations using "Carlon Solvent Weld Cement" to insure all joints are watertight.

Q. Conduit buried in or beneath building slabs or exterior below grade shall be full weight rigid galvanized steel or Carlon Schedule 40 PVC. The conduit will be encased in 3" concrete envelope or as called for on the Plan Drawings. All elbows and stub ups shall be rigid galvanized steel. All joints and terminations for PVC shall be made according to manufacturer's recommendations using "Carlon Solvent Weld Cement" to insure all joints are watertight.

R. Conduits and cables entering from outside the building shall be sealed water and moisture tight. Seal between conduit and sleeves, conduits and core drilled holes and around conductors inside conduits. Provide cast iron pipe or Schedule 40 galvanized steel conduit sleeves in exterior walls below grade, with intermediate wall stop and anchor collar set in place before concrete pouring. Sleeve shall be a part of the sealing assembly. When the wall opening is core drilled, the wall sleeve may be omitted. A mechanically compressed rubber sealing assembly equal to Thunderline Corp. "Link-Seal" shall be placed in the annular space between conduit and sleeve or core drilling.

S. Layout the conduit system to avoid crossing building expansion joints. Where crossings are necessary, use expansion joints.

T. Do not install wall mounted flush boxes back-to-back in opposite sides of a wall, in stud walls, boxes shall be on opposite sides of studs.

U. On campus excavation:

1. Trenching, digging and other types of excavation on OWNER property requires an "OWNER Dig Permit." Technology Resources must originate "OWNER Dig Permits." Care should be taken by the contractor/installer to include landscaping restoration when bidding jobs.

V. Off campus excavation:

1. It is the responsibility of the contractor/installer to obtain all city permits and utility marking prior to the beginning of each project. Care should be taken by the contractor/installer to include landscaping restoration when bidding jobs.

END OF SECTION

SECTION 28 10 00

ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All requirements under Instructions to Bidders, General Conditions, Supplementary Conditions, Special Conditions, Division One (1), Technical Specifications, Referenced Documents or Practices and any Addenda of these Specifications shall be a part of this section. Each Contractor is responsible to be thoroughly familiar with all its contents as to requirements which affect this Division or Section.

1.2 REFERENCES

A. NFPA-780 -- For the Installation of Lightning Protection Systems

B. NFPA-70 -- National Electrical Code

C. NESC -- National Electrical Safety Code

D. National Fire Protection Association (N.F.P.A.).

E. American National Safety Institute (A.N.S.I.).

F. National Electrical Code (N.E.C.).

G. Underwriters Laboratories (U.L.)

H. National Cable Television Association (N.C.T.A.)

I. International Telecommunications Union (I.T.U.-T.)

1.3 RESPONSIBILITY AND RELATED WORK

A. The systems described in this section will be called the "Electronic Access Control System and Intrusion Detection System", hereafter referred to "the systems", and the installer will be named "the Contractor." The Contractor shall provide all labor, materials, equipment, necessary tools, test equipment, hoisting, transportation, supervision and coordination necessary to complete the installation of System as described in these specifications and illustrated on the Project drawings.

B. The Contract Documents are intended to include or imply all items required for the proper execution and completion of the work. Any item of work required by the Specifications or other portion of the Contract Documents but not shown on the drawings, or shown on the

drawings but not specifically required in the Specification shall be identified prior to Bid Submittal.

C. The System consists of the materials, wire, equipment, and Owner training described in this specification, related drawing details, and any schedules that are part of the construction document set. The work of this section includes a complete and operational System for the facility.

D. The Contractor shall provide minor accessories, such as connectors, adapters, matching devices and equipment items needed for a complete system, even if not specifically mentioned herein or on the drawings, without claim for additional payment.

E. Notwithstanding any detailed information in the Contract Documents, it is the responsibility of the Contractor to supply systems in full working order. Contractor shall notify Consultant of any discrepancies in part numbers or quantities prior to bid submittal. Failing to provide such notification, the Contractor shall supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.

F. The Contractor shall obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

G. Contractor shall comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the Construction Manager.

H. If a conflict is identified between the contract documents and the appropriate codes and is reported to the Construction Manager and confirmed prior to bid opening, Consultant shall prepare the necessary clarification or revision. When a conflict is reported after contract award, the Contractor shall propose a resolution of the conflict and, upon approval, perform related work.

I. The Contractor shall coordinate with other trades as required and in a timely fashion to convey all information (scheduling, structural, electrical, technical or otherwise) necessary to the completed project.

J. The Contractor shall be responsible for connecting ground point to all equipment in accordance with NEC code and standards specified. Coordinate with the Division 26 Contractor.

K. The Contractor shall terminate all cabling for all control panels, card readers, request to exists, sensors, intercom stations, and all other items as described within this section.

L. The Contractor will provide and install all wall mounted back-boards, patchbays, punchblocks, terminal strips and other items as required for installation of equipment described herein.

M. The Contractor will test, label, and document all cables installed under this section of work.

N. The Contractor shall provide all programming required for Electronic Access Control and IP Intercom systems.

O. The Division 26 scope of work will include the following:

1. Provision and installation of all AC power circuits, outlets and power panels.

P. The Division 8 scope of work will include the following:

1. Preparation of all doors receiving electronic access control hardware.
2. Supply and installation of all electro-mechanical door hardware including power transfer loops, power transfer hinges, electrified mortise locksets and electric latch retraction exit devices, unless specifically stated otherwise.

Q. The Division 28 05 29 scope of work will include the following:

1. Supply and installation of all cable tray, raceways, conduit, junction boxes, gang boxes, pull boxes and pull strings required for the specified system.

R. The Division 28 05 14 scope of work will include the following:

1. Supply and installation of all low voltage cable required for the specified system.

1.4 SYSTEM DESCRIPTION

A. Electronic Access Control (EAC) System

1. Door Contacts
   a. Door contact cabling will be provided for selected doors within the facility.
   b. The intent of the door contacts is to trigger an alert when the door is opened. The door opening will be entered into a log file.
   c. All door contact cabling shall be routed to the nearest IDF Closet via conduit and/or the communications cable tray.
   d. Door position switches on all perimeter doors will be wired to both the Access Control System and the Intrusion Detection System.

2. Card Access
   a. Card access cabling will be provided for selected doors within the facility. Doors with Card Access will allow only those personnel with an active security badge to open the electronically locked door.
   b. All card access cabling for interior doors shall be routed to the nearest IDF Closet via conduit and/or the communications cable tray.

3. Control Panels
   a. Control Panels will be installed in each IDF Room. Card readers and other access control hardware at specific doors will connect to the Control Panel in the IDF Room specified on drawings DT601 and DT602.

B. Intrusion Detection System (IDS)

1. Door Contacts
   a. Door position switches on all perimeter doors will be wired to both the Access Control System and the Intrusion Detection System.
   b. The intent of the door contacts is to trigger an alert when the door is opened. If the intrusion detection system is armed, a signal from a door contact will result in an alert to the facility security personnel or to a central monitoring station.

c. All door contact cabling shall be routed to the nearest IDF Closet via conduit and/or the communications cable tray.

2. Motion Sensors
   a. Motion sensors will be installed in select locations throughout the facility.
   b. The intent of the motion sensors is to trigger an alert if the system is armed and motion is detected. If the intrusion detection system is armed, a signal from a motion sensor will result in an alert to the facility security personnel or to a central monitoring station.
   c. All door contact cabling shall be routed to the nearest IDF Closet via conduit and/or the communications cable tray.

3. Duress Pushbuttons
   a. Duress Pushbuttons will be installed at the Reception Desk.
   b. The intent of the duress pushbutton is to trigger an alert if the pushbutton is activated. At all times, a signal from a duress pushbutton will result in an alert to the facility security personnel or to a central monitoring station.
   c. All duress pushbutton cabling shall be routed to the nearest IDF Closet via conduit and/or the communications cable tray.
   d. A quantity of 6 wireless panic key fobs will be provided.

4. Control Panels
   a. Control Panels will be installed in select IDF Rooms. Intrusion Detection Sensors will connect to the Control Panel in the IDF Room specified on drawings DT601 and DT602.

1.5 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division-1 Specification Sections.

1. Scope of Work: Vendor's narrative of services that will be provided to be submitted to Owner/Consultant before start of any work. Provide a complete understanding of Owner/Consultant's request for services. Include a time-line, information of on-site techs including their qualifications, and acceptance of this document and all that it entails and references.
2. Product Data: Submit manufacturer's product data sheets for each item of equipment in accordance with Part 1 of the project manuals indicating compliance with specified requirements. Any requests for substitutions of materials from manufacturers not represented in the design documents must be submitted and approved prior to submitting

the Product data. Only specified or accepted manufacturers or suppliers products shall appear in the Product Data Submittal.

3. Shop Drawings: Indicate complete details and dimensions of work to be performed and indicate types and locations of equipment, fabricated equipment, and other details to completely describe work to be performed.
   a. There shall be no work authorized on site without the prior submittal of a complete set of shop drawings. Any exceptions to this must be in writing and approved by the Construction Manager.
   b. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. Perform no portion of the work requiring submittal and review of shop drawings, product data, or samples until the respective submittal has been approved. Such work shall be in accordance with approved submittals.
   c. By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents.
   d. The Consultant's approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents. The contractor shall continue to be responsible for deviations from requirements of the original contract documents that are issued in writing as contract change directives (i.e. change orders, RFIs, CCDs, etc.)
   e. The Consultant's review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The Consultant's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The Consultant's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
   f. Illegible submittals will not be checked by the Consultant.
   g. Details to include the following:
      1) Door Contact and Card Access location, orientation, and mounting methods in coordination with architect's door schedule.
      2) Rack/Furniture Layout and Location Diagrams with overall dimensions.
      3) Location of all equipment in racks, consoles, millwork, enclosures with dimensions; wire routing and cabling within housings; AC power outlets, terminal strip and UPS locations.
      4) Schematic Diagrams for all Systems, including all wiring labels.
      5) Schedule of Terminations for all systems.
      6) AC power schedule.

4. Programming Submittal
   a. Submit a programming outline for the Access Control System. This will require a meeting with the Owner and Consultant to discuss security system operations, time

of day events, door contact switching. The Contractor is not responsible for entering every card holder into the database, but is responsible for setting up all potential security groups that the Owner requires. Final acceptance and program changes required by the owner after initial programming will be considered part of the Owner training as outlined in section 3.9, E

5. Bid Submittals:
   a. Bidder will confirm in writing that the firm maintains a fully staffed and equipped service facility, and that the firm is a franchised dealer and authorized installer / service facility for the major brands specified, and that the firm is properly licensed to work in the project home State.
   b. Bidder will confirm in writing that any Sub-contractor firm maintains a fully staffed and equipped service facility, and that the firm is a franchised dealer and authorized service facility for the major brands specified, and that the firm is properly licensed to work in the project home State. Bidding contractor will identify all Sub-contractors on the Bid Response team and a detailed scope of work for each Sub-contractor.
   c. Provide a Schedule of Values with unit prices for all systems. Schedule of Values will be used for any add or deduct Change Orders. Bid responses without Schedule of Values will be returned without review. Bidding Contractor will submit spreadsheet indicating manufacturers, model numbers, descriptions, total quantities, unit costs, and extended costs. Any proposed substitutions to the specified equipment must be noted within the Schedule of Values included with the Bid Submittal. Attach Schedule of Values at end of bid form.
   d. Provide a schedule indicating durations for shop drawing submittal, lead times, procurement, and fabrication, shipping requirements, installation timelines for each major system and test and commissioning sessions. Coordinate these milestone dates with intended completion dates for this project.

1.6 CONTRACT CLOSEOUT SUBMITTALS

A. Comply with all requirements of Specification Division 1.

B. Keep a complete set of approved shop drawings on the job at all times. Non-approved shop drawings will not be allowed on the job site. Note any changes made during installation on a single set of drawings. This set of marked up drawings will not leave the jobsite until after the final system commissioning. All "as-built" drawings to be provided both in ACAD form (2018 or later) and in PDF.

C. System Reference Manual: Prior to Owner training, furnish 1 copy, in 3 ring binders, sized to hold the material plus 50% excess, with clear vinyl pockets on cover and spine for project title. Provide tabular dividers with permanent legends for the following sections:

1. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity. This procedure should describe the operation of all system capabilities. Assume the intended reader of the manual to be technically inexperienced and unfamiliar with this facility.
2. A list of all test results performed on the systems as outlined in Section 3.7, G proving the systems to be in full compliance.

3. A list of all equipment, indicating manufacturer, model, serial number, and equipment location (i.e. rack/room number). Update following acceptance testing, if changed.
4. A list of all settings of all semi-fixed controls. Update this document after the final acceptance testing.
5. All "as-built" drawings to be provided both in ACAD form (2018 or later) and in PDF.
6. Manufacturer's Instruction Manuals for all items of equipment, incorporating or followed by manufacturer's warranty statements. For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item.
7. Manufacturer's Service Manuals and parts list for all equipment. Photocopies are not acceptable. For custom circuits or modifications, complete schematics and parts lists.
8. Maintenance Instructions, including Contractor's maintenance phone number(s) and hours; maintenance schedule, description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
9. A legend of acronyms and abbreviations must accompany all documentation.
10. Replacement parts lists of major items of equipment.
11. Provide written report for dates of replacement of all batteries. This is to include UPS, and control systems.

D. Software Licensing and Manuals. Provide backup computer discs, all software manuals and license certificates for all software loaded on all PC's.

E. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor will certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

F. Provide a complete list of spares inventory to include quantity, manufacturer, model number, and serial number.

1.7 CODE COMPLIANCE

A. All work and materials shall comply with all applicable codes and regulations to meet or exceed Federal, State, City, and Local Building Codes and Regulations. Advise the Construction Manager if anything in the Plans or Specifications is out of compliance with codes and/or laws prior to bidding.

B. Comply with General Conditions and Section 01600/Materials and Equipment of CSI manual.

1.8 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify the Construction Manager in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The drawings diagrammatically show cabling, conduit, wiring, and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to the Consultant for approval, showing how the work may be installed.

1.9 GUARANTEES

A. The Contractor shall warrant new equipment to be free of defects in materials and workmanship for not less than one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty shall be rectified by replacement or repair. Within the warranty period, provide answer to service calls and requests for information within a 24-hour period, and repair or replace any faulty item within a 72-hour period without charge, including parts and labor.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time. Nor shall it void any rights guaranteed to the Owner by law.

C. Contractor to provide Owner with exact beginning and ending dates of the warranty period. Include the name of the person to call for service and telephone number. This information to be part of Project Record Set.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section will not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Construction Manager.

B. All devices and control stations will be UL Certified with attached identification label. If any equipment used is not UL Certified, then the Contractor will arrange onsite inspections and certification at no additional expense to the Owner.

2.2 ACCEPTABLE MANUFACTURERS

A. Provide equipment specified.

B. If product is discontinued and/or no longer publicly advertised as a part of a manufacturer's current product line-up at time of installation, the project team reserves the right to request a substitution of product for new and currently offered product of like function fulfilling the design intent. Substitution value will be based on fair market value of original product at time of bid.

2.3 GENERAL

A. All equipment supplied will be new and meet the latest published specifications of that product. Take care during installation to prevent scratches, dents, chips, etc.

B. Delivery, Storage and Handling.

1. The contractor shall be responsible for safekeeping their materials and property, such as equipment and construction materials, on the job site. The owner assumes no responsibility for protection of above-named property against fire, theft, and environmental conditions.

2. Provide handling and shipping in accordance with manufacturer's recommendation.
3. Provide protective covering during construction to prevent damaging or entrance of foreign matter.
4. Replace at no expense to Owner, product damaged during delivery, storage or handling.

2.4 ACCESS CONTROL EQUIPMENT

A. Access Control Software

1. The proposed Access Control Software and associated hardware must be capable of integrating seamlessly with the existing Software House C-CURE 9000 access control systems utilized at other SD Library facilities. Integration of this facility with other SD Library facilities is not included in the scope of work for this project.
2. The Contractor will be responsible for purchasing any software licenses required.
3. Approved Access Control Platforms:
    a. Software House C-CURE 9000
    b. Or approved equal

B. Access Control Server

1. Installed in data racks in IT Room 117.
2. Approved Access Control Server:
    a. Software House C-CURE 9000 SiteServer Model SSVR2-32
    b. Or approved equal

C. Door Control Panels

1. Door Control Panels will be installed in each IDF Room. Card readers and other access control hardware at specific doors will connect to the Control Panel in the nearest IDF Room. Communication between the Door Control Panels and Access Control Server/Host Computer will be via TCP/IP.
2. Refer to schedules on drawings DT601 and DT602 for information regarding assignment of access control devices to IDF rooms.

D. Access Control System Door Controllers and Interface Modules

1. 8-Door System Controllers
    a. Ethernet port for upstream communication to host computer.
    b. On-board interfacing for 8 card readers and other associated door I/O contacts.
    c. Includes enclosure and power transformer, cabinet lock, lock power supply, backup battery, tamper switch
        1) LifeSafety Power FPO150-B100D8M8NL4E4S
        2) Software House iSTAR Ultra GCM (Qty: 1)
        3) Software House iSTAR Ultra ACM (Qty: 1)
        4) Backup Batteries
    d. Or approved equal

2. 16-Door System Controllers
   a. Ethernet port for upstream communication to host computer.
   b. On-board interfacing for 16 card readers and other associated door I/O contacts.
   c. Includes enclosure and power transformer, cabinet lock, lock power supply, backup battery, tamper switch
      1) LifeSafety Power FPO150/250-2D82M8NL4E8S
      2) Software House iSTAR Ultra GCM (Qty: 1)
      3) Software House iSTAR Ultra ACM (Qty: 2)
      4) Backup Batteries
   d. Or approved equal

3. PoE powered 1-Door System Controller (Theme Tower)
   a. Ethernet port for upstream communication to host computer.
   b. On-board interfacing for 1 card reader and other associated door I/O contacts.
   c. Includes enclosure and power transformer, cabinet lock, lock power supply, tamper switch
      1) Software House ESTAR001-POE1
      2) Or approved equal

E. Card Readers

1. Wall-Mounted Card Readers
   a. Mounts to 1-gang box
      1) HID MultiCLASS SE RP40
      2) Or approved equal

2. Mullion-Mounted Card Readers
   a. Mounts to door mullion
      1) HID MultiCLASS SE RP15
      2) Or approved equal

F. Hinged Door Magnetic Door Position Switches

1. Double Pole / Double Throw
   a. GRI 195-12WG
   b. Or approved equal

G. Overhead Door Magnetic Door Position Switches

1. Double Pole / Double Throw
   a. GRI 280-36
   b. Or approved equal

H. Passive Infrared Request-to-Exit Sensor

1. Optex OP-08CW
2. Or approved equal

2.5 INTRUSION DETECTION EQUIPMENT

A. Approved Intrusion Detection Platforms:

1. DMP XT and XR

B. Control Panels and Accessories

1. Control Panel
   a. DMP XR150
   b. DMP 352P-G Enclosure
   c. DMP 263LTE-A/V Cellular Communicator (verify cellular carrier with Owner)
   d. DMP 714-16PCB Zone Expansion Module (Qty: 1)
   e. DMP 366 sealed lead-acid battery, 12 VDC, 18 aH
   f. Or approved equal

2. Control Panel (Theme Tower)
   a. DMP XT30
   b. DMP 263LTE-A/V Cellular Communicator (verify cellular carrier with Owner)
   c. DMP 368 sealed lead-acid battery, 12 VDC, 5 aH
   d. Or approved equal

C. Expansion Panels and Accessories

1. Expansion Panels/Enclosure
   a. DMP 714-8PCB Zone Expansion Module (Qty: 1)
   b. DMP 714-16PCB Zone Expansion Module (Qty: 1)
   c. DMP 350A Enclosure
   d. Or approved equal

D. Control Keypads

1. DMP 7060-W
2. Or approved equal

E. Wall-Mount Motion Sensors

1. Optex MX40QZ
2. Optex FA-3 Wall Bracket
3. Or approved equal

F. Ceiling-Mount Motion Sensors

1. Optex FX-360
2. Or approved equal

G. Wired Under-Counter Duress Pushbuttons

1. Amseco HUSD-15B
2. Or approved equal

H. Wireless Under-Counter Duress Pushbuttons

1. Amseco HUSD-15B (or approved equal)
2. DMP 1102 Wireless Transmitter
3. Or approved equal

I. Wireless Door Position Sensor Transmitter

1. DMP 1106
2. Or approved equal

J. High-Power Wireless Transceiver

1. DMP 1100XH
2. Or approved equal

K. Two-Button Wireless Panic Key Fob

1. DMP 1144-D (Qty: 6)
2. Or approved equal

2.6 SECURITY NETWORK SWITCHES

A. Switches shall be provided by Owners IT Dept..

2.7 CABLE, CONTROL WIRING & TERMINATIONS

A. Refer to section 1.3 for Responsibility and Related Work.

B. Refer to Drawings DT501 through DT504 for cable and accommodation details.

Contractor will verify all connector details required for installation of equipment, including make, model, connector sex, attachment configuration, pin-outs, and cable clamp accessories

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. When directed by the Construction Manager, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent, or to meet local codes.

C. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.

D. Cover edges of cable pass-through holes in chassis, racks, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting. Adhesive-backed electrical tape and friction tape is not acceptable for insulating or protective purposes.

E. All rack and console dimensions must be verified against field conditions prior to fabrication and again prior to installation.

F. Where possible, mount equipment and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Consultant in writing that racks shall be fabricated on site and the reasons for the change.

G. Inspect all racks, consoles, and enclosures prior to installation. All rough or sharp edges that may cause injury to personnel must be deburred or a permanent protective coating applied.

H. Install rack mounted equipment with black 10-32 Phillips head machine screws.

I. Panels or equipment mounted on the rear rack rails must not block access to any front mounted components. Front mounted equipment will be given ample space to allow for access to rear connection.

J. AC Power and Grounding

1. Coordinate final connection of power and ground wiring to racks. Hardwire power wiring directly to power contacts or internal AC receptacles to ensure uninterrupted operation.
2. Install 3-conductor, 120 VAC outlets in each rack. Provide a minimum of two spare outlets in each rack. Label each outlet as to which AC circuit is feeding it and provide the same information in the circuit breaker panel.
3. Each equipment rack will have sufficient power outlets to provide an outlet for every power cord required by installed equipment or equipment designed for future installation, and at least one additional outlet for every eight rack units of panel mounting space.

3.2 STAFFING

A. The Contractor shall keep a qualified named foreman on-site and in charge of the work at all times. Such foreman shall be approved by the Construction Manager and will be replaced if the Construction Manager finds such foreman to be unsatisfactory.

B. Use craftsmen and installers possessing the necessary licenses and permits and skilled in their trade for all work.

C. The Contractor shall use only skilled, experienced and reliable workers and shall immediately discontinue the services of anyone employed on this project upon written request of the Owner or Construction Manager.

D. All crafts personnel shall be fully licensed and qualified to perform the work designated herein.

E. Contractor is responsible for providing installers with the required tools to perform each activity. Installers shall be adequately trained in the use of all tools prior to beginning work. Tools must be maintained in good working order. The Construction Manager reserves the right to review the tool lists and tool maintenance procedure of the Contractor. Tools deemed unserviceable by the Construction Manager shall be replaced immediately.

3.3 PROTECTION OF WORK AND PROPERTY

A. The Contractor shall assume full responsibility for any damage or defacement they cause to any other trades finished work and shall remedy any such damage or defacement at their own expense as required as soon as possible.

B. The Contractor shall perform daily clean-up of their own debris in their work area. All debris shall be placed in the containers and/or locations as directed by the Construction Manager.

C. Coordinate storage and work space requirements with the Construction Manager.

3.4 PRE-INSTALLATION SITE SURVEY

A. Prior to the start of systems installation, meet at the project site with the Construction Manager and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with

the Construction Manager shall be necessary to plan the crucial scheduled completions of the equipment rooms and telecommunications closets.

B. Confirm locations of plenum ceilings where CMP rated cables will be required.

3.5 CABLING

A. Take precautions to prevent and guard against electromagnetic and electrostatic hum.

B. Exercise care in wiring; damaged cables or equipment shall not be accepted. Isolate cables of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation. Keep wiring separated into groups for power circuits, video circuits and control/data circuits.

C. Wiring entering equipment racks will be run directly to equipment. Use of splices or connectors to extend cabling to equipment will not be accepted. All signal wiring will be continuous and unbroken from connector plate/chassis to chassis/patch panel. Use of intermediate connections for inter rack cables is not acceptable. Use of splices or connectors to extend cabling to equipment is not acceptable.

D. Make joints and connections with rosin-core solder or with mechanical connectors approved by the Consultant. Where spade lugs and BNC terminations are used, trim cable using manufacturer recommendations and crimp properly with ratchet type tools. Spade lugs mounted on 22 gauge or smaller cable to be soldered after crimping.

E. If required, wiring entering equipment racks should connect via terminal blocks (Cinch 140 - 142 Series) or on Entrelec blocks; terminal blocks will be fully exposed, labeled, and mounted on 3/4 inch plywood board painted flat black. If Qty of terminals is too numerous to fit in rack, terminal blocks may be located on wall mounted plywood terminal board adjacent to rack. Mounting boards to be 3/4 inch A/C grade or hardwood plywood painted flat black. Terminal board wiring to meet the same requirements as internal rack wiring described below.

F. Wiring and connections will be completely visible and labeled in rack.

G. Run vertical wiring inside rack in properly sized plastic raceway with snap-on covers (Panduit Type E series.)

H. All power cables will run on the left side of the equipment rack, as viewed from the rear. All other cables will be run on the right side on the equipment rack, as viewed from the rear. Where signal cabling and any cabling types carrying power must cross, they will do so at right angles. Vertical wiring will be run with a bundling and support system, to maintain a clear and organized appearance.

I. Horizontally routed wiring to equipment will be neatly tied in manageable bundles with cable lengths cut to minimize excess but still allow ready access for service and testing. Provide horizontal support bars if cable bundles sag

J. For equipment mounted on slides, additional service loops will be provided to accommodate the full range of travel of the slides. This includes all power, ground, control and signal cables.

K. Neatly bundle excess AC power cables from rack-mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive backed cable tie anchors are not acceptable. Cable tie and lacing installation will be accomplished using hand tools specifically designed to apply proper tension to the cable tie, and to cut it off flush with no protruding sharp edges. Cable ties will not be applied with excessive force, which may damage or deform sensitive and fragile cables.

L. Screw Connections: Only insulated crimp on spade terminals will be used for application to barrier strips. Multiple gang lugs or ring lugs are not acceptable for this purpose.

M. This is only applicable to stranded conductor wires. Solid conductors will be attached directly to the barrier strip.

N. All conductors will be stripped prior to installation underneath screws on terminals. Provide crimp lugs on stranded control cables, solid conductor wire will not require crimp lugs on individual conductors. All screw terminated solid conductors will be wrapped in the same direction as screw rotation during tightening.

O. Multiconductor Cables: Follow a uniform application of color codes for multiconductor cables throughout the Facility. Where there are unused conductors or pairs in a cable assembly, they can be insulated as a group, left long enough for future termination, and folded into the connector hood. Where this is impractical, they may be folded back along the outer jacket of the cable and covered with heat-shrinkable tubing.

P. Multipin Connectors: Where jumpers are indicated between pins of the same connector, they will be installed internal to the connector shell and will not have any cable number designations applied to the jumper.

Q. Exercise care in wiring; damaged fiber, cables or equipment shall not be accepted.

R. Leave neatly bundled and positioned service loops of 25' or longer length on both ends.

S. All wiring in publicly accessible spaces shall be concealed in walls. Alternatively, surface mounted raceway systems may be used. The method of wiring shall be proposed to the owner and approval must be granted prior to proceeding with the work.

T. Protect all cable from physical damage. Maintain proper radius per manufacturer's requirements. Support riser cable uniformly per manufacturer's requirements to prevent undue stress on cable or bends.

U. Unless otherwise noted, all cables shall be routed through the building cable tray/conduit system. Refer to the Data drawings for the layout of the conduits and cable tray.

V. If at any time during the job the cable tag becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a duplicate pre-printed cable tag at the Contractor's expense.

W. Twisted pair metallic cables: Cable pair twists shall be maintained up to within ½ inch of the point of termination for "Category 6" backbone cables. For other backbone cables, maintain twists as close as practicable to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

X. Twisted pair metallic cables: Cable pair twists of Category 6 Cable shall be maintained up to within 1" of the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

Y. Twisted pair metallic cables: Do not bend Category 6 station cables to a radius of less than eight (8) times the cable diameter.

Z. Cross-connect wire: Cable pair twists shall be maintained as close as practicable to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

AA. Cable tags shall be placed as per these specifications. Tags containing a unique cable ID designator shall be placed on both ends of all cables, 6 inches from the connector and/or terminal block. Also label all backbone cables passing through telecommunications rooms.

BB. Location and placement of termination blocks, splice closures, splices and other distribution hardware shall be as shown on the Drawings or defined in the cable schedules.

3.6 LABELING

A. General

1. The attachment method for equipment identification plates will be designed for permanency unless otherwise described. All labels will be protected prior to installation, and will not be installed if damaged or scratched. Follow manufacturer's recommended procedure for surface preparation, which must be free of any dust, dirt or film. Wiping with a manufacturer-approved solvent is required. If a label is in a place that might be susceptible to damage, it will be protected with a layer of clear plastic, 1/16" or thicker, taped down. Internal labels will be replaced only if they become illegible. External labels will be replaced if they become scratched or marred.
2. On black lamicoid panels or pushbuttons, letters shall be white; on stainless steel or brushed natural aluminum plates, or light-colored pushbuttons, letters shall be black.
3. Embossed labels are not acceptable.
4. Mount labels in a neat, plumb and permanent manner except where indicated.
5. Text heights will be as follows:
    a. Rack designation labels will have 1" high block sans serif text.
    b. Equipment labels will be 3/4" high block sans serif text.
    c. Operator Control labels will be 1/4" high block sans serif text, this may be adjusted to fit available space.
    d. Panel labels will be 1/8" high block sans serif text.
    e. Patchbay, Cable and Connector labeling will be 10 point block sans serif text, this may be adjusted to fit available space.

B. Equipment Labels

1. Provide engraved lamicoid labels on the front and rear of active equipment mounted in racks. Front mounted equipment labels for the video monitor wall monitors are to be mounted with Velcro. Equipment labels to have one line of engraving, giving the schematic reference of the device, and/or its production function, i.e. "DDR #4", "MON #1".

2. Unless equipment manufacturer has clearly labeled functions, provide an engraved label over each user-operated control that describes the function or purpose of the control.
3. If the manufacturer provides a protected labeling strip such as those used for switcher control panels and patch bays, then patch/routing point labels may be typed clearly on 80 pound paper stock.

C. Cable Labels

1. Cables and wiring to be logically, legibly and permanently labeled for easy identification. Labels on cables to be adhesive strip type covered with clear heat-shrink tubing. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style label. Hand-written or self-laminating type labels are not acceptable.
2. Wiring designations to be an alphanumeric code that is unique for each cable. Locate the cable designation at the start and end of each cable run and within 2 inches of the point of termination or connection. For cable runs that have intermediate splice points, the cable shall have the same designation throughout with an additional suffix to indicate each segment of the run. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings included with Project Record Drawings.
3. Provide adhesive labels on the rear of equipment where cables attach to indicate the designation of the cable connected at that point.

3.7 ACCEPTANCE

A. Provide a pre-commissioning systems report to the Consultant two weeks prior to the scheduled systems commissioning proving all systems to be in full compliance. Report shall include test results, date of each test, pertinent conditions such as control settings, etc., and test equipment employed. In addition, submit written notification that the installation has been completed in accordance with the requirements of the Contract Documents, and is ready for acceptance testing.

B. Acceptance testing will include operation of each major system and any other components deemed necessary. Contractor will assist in this testing and provide required test equipment. Contractor will provide at least two technicians familiar with installation, available for the entire testing period (day and night), to assist in tests, adjustments, and final modifications. Tools and material required to make any necessary repairs, corrections, or adjustments will be furnished by the Contractor. The Contractor will keep a running list of all acceptance tests performed and submit a final copy of the results with the closeout submittals as listed in Part 1.6. Testing process is estimated to take 2 days up to 10 hours per day and may require multiple crews / shifts.

C. During all consultant walkthroughs, the Contractor's project manager will be present.

D. If during acceptance testing it becomes evident that further adjustment or work may be required to bring the system into compliance, the Contractor will continue to work until the system is acceptable at no additional charge to the contract price. If approval is delayed because of defective equipment, poor installation, or failure of equipment to meet the requirements of these specifications, the Contractor will pay for additional time and expenses of the Consultant at the Consultant's standard rate in effect at that time, during any extension of the acceptance

testing period. The Contractor will provide rental or loaner equipment to make the system operational in critical cases of equipment failure prior to contract completion.

E. Provide three portable UHF business band radios for use during acceptance testing. Radios should have a transmission range sufficient to cover entire project. Radios to include rechargeable batteries and re-charger along with "holster" for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance. Confirm that radio frequencies used are not in use elsewhere on project site.

F. Verify the following before beginning actual tests and adjustments on the system:

1. Electronic devices are properly grounded.
2. Powered devices have AC power from the proper circuit and hot, neutral, and ground conductors are connected correctly.
3. Insulation and shrink tubing are present where required.
4. Dust, debris, solder, splatter, etc. is removed.
5. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.

G. System Tests.

1. at least 7 days prior to connection of system equipment. All testing shall comply with TIA/EIA TSB 67 Standards.
2. Control functions shall be checked for proper operation, from controlling devices to controlled devices.
3. Adjust, balance, and align equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and record these settings, in the "System Operation and Maintenance Manual".
4. Installed and loose equipment shall be inventoried for correct quantity.
5. Any other test on any piece of equipment or system deemed appropriate by Consultant.
6. The omission of a description of a device, function, signal path, or test in this document shall not exempt the Contractor from responsibility for checking all devices and signal paths for appropriate compliance with Industry Performance Standards and making corrections necessary to bring system(s) into compliance with the applicable standards.
7. Test all data cables for length, impedance, resistance, capacitance, attenuation, next loss and inverted pairs with an Fluke CableIQ tester or approved equal. All points shall pass the test for Category standard of cable installed. Submit printed test data to the Construction Manager Paired and multi-conductor metallic cables:
    a. After terminating the cables, test all cable pairs for continuity, ground fault, proper cross-connection, shorts and crossed pairs.
    b. For multi-pair cables: For 25 pair or smaller replace entire cable if bad pair or conductor is found. For larger pair count cables, replace if more than 2% of the pairs are bad.

8. Recommended test equipment (obtain approval of Construction Manager and Consultant prior to using substitute test equipment):
    a. Fluke CableIQ
    b. Ideal SignalTek II
    c. ByteBrothers Low Voltage Pro
    d. Or approved equal

9. In the event that test results are not satisfactory, the contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests which disclosed faulty or defective material, equipment, or installation method, and shall perform additional tests as the Consultant deems necessary.

3.8 TEST EQUIPMENT

A. Provide the following equipment on site for final acceptance testing. Test equipment to be available for the entire period through final system acceptance. Prior to start of testing, provide a list to the Consultant of test equipment make and model numbers that will be used.

1. Megohmeter.
2. Multimeter: Measurement range, DC to 20,000 Hz, 100 mV to 300 V, 10 ma to 10A. Acceptable: Fluke 75.
3. CAT6 cable tester: Acceptable:
   a. Fluke CableIQ
   b. Ideal SignalTek II
   c. ByteBrothers Low Voltage Pro
   d. Or approved equal

3.9 INSTRUCTION OF OWNER PERSONNEL

B. Upon completion of the installation of the specified security systems, and prior to any facility events, provide designated operating personnel training on the equipment operation. This training will be performed at the site by the Contractor's and the manufacturer's education staff.

C. The System Reference and Service Manuals must be complete and on-site prior to the time of the first instruction.

D. Coordinate schedule of instruction with the Owner subject to availability of Owner's personnel. This may require scheduling instruction during weekends or evenings.

E. Training will be provided in a series of classes to operations personnel to review all aspects of operation and maintenance of the system. Follow-up sessions to better enhance the operator's ability to expand or maximize the system will be made available.

F. The system training will include one (1) days or eight (8) hours of technical training covering the explanation of the system, including documentation, configuration, interfacing and diagnostics. Provide training of the video system operators and maintenance personnel as follows:

1. System Overview: Explanation of system includes documentation, configuration, interfacing and basic diagnosis.
2. Operator Training General: Basic training in the use of system devices including badging, monitoring, recording and general operation of overall system.
3. Operator Training Specific: Advanced training in use of system devices including terminal equipment, signal routing, monitoring, recording, etc.

END OF SECTION

SECTION 28 23 00

VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All requirements under Instructions to Bidders, General Conditions, Supplementary Conditions, Special Conditions, Division One (1), Technical Specifications, Referenced Documents or Practices and any Addenda of these Specifications shall be a part of this section. Each Contractor is responsible to be thoroughly familiar with all its contents as to requirements which affect this Division or Section.

1.2 REFERENCES

A. NFPA-780 -- For the Installation of Lightning Protection Systems

B. NFPA-70 -- National Electrical Code

C. NESC -- National Electrical Safety Code

D. National Fire Protection Association (N.F.P.A.).

E. American National Safety Institute (A.N.S.I.).

F. National Electrical Code (N.E.C.).

G. Underwriters Laboratories (U.L.)

H. National Cable Television Association (N.C.T.A.)

I. International Telecommunications Union (I.T.U.-T.)

1.3 RESPONSIBILITY AND RELATED WORK

A. The systems described in this section will be called the "Video Surveillance Systems", hereafter referred to "the system", and the installer will be named "the Contractor." The Contractor will provide all labor, materials, equipment, necessary tools, test equipment, hoisting, transportation, supervision and coordination necessary to complete the installation of System as described in these specifications and illustrated on the Project drawings.

B. The Contract Documents are intended to include or imply all items required for the proper execution and completion of the work. Any item of work required by the Specifications or other portion of the Contract Documents but not shown on the drawings, or shown on the drawings but not specifically required in the Specification shall be identified prior to Bid Submittal.

C. The System consists of the materials, wire, equipment, and Owner training described in this specification, related drawing details, and any schedules that are part of the construction document set. The work of this section includes a complete and operational System for the facility.

D. The Contractor shall provide minor accessories, such as connectors, adapters, matching devices and equipment items needed for a complete system, even if not specifically mentioned herein or on the drawings, without claim for additional payment.

E. Notwithstanding any detailed information in the Contract Documents, it is the responsibility of the Contractor to supply systems in full working order. Contractor shall notify Consultant of any discrepancies in part numbers or quantities prior to bid submittal. Failing to provide such notification, the Contractor shall supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.

F. The Contractor shall obtain all licenses and permits necessary for the execution of any work pertaining to the installation, or any operation by the Owner.

G. Contractor shall comply with all union jurisdiction requirements for the completion of the project. Questions regarding jurisdiction should be directed to the Construction Manager.

H. If a conflict is identified between the contract documents and the appropriate codes and is reported to the Construction Manager and confirmed prior to bid opening, Consultant shall prepare the necessary clarification or revision. When a conflict is reported after contract award, the Contractor shall propose a resolution of the conflict and, upon approval, perform related work.

I. The Contractor shall coordinate with other trades as required and in a timely fashion to convey all information (scheduling, structural, electrical, technical or otherwise) necessary to the completed project.

J. The Contractor shall be responsible for connecting ground point to all equipment in accordance with NEC code and standards specified. Coordinate with the Division 26 Contractor.

K. Other than Category cables terminated by the 27 15 00 contractor, The Contractor shall terminate all cabling for video surveillance equipment.

L. The Contractor will provide and install all wall mounted back-boards, punchblocks, terminal strips and other items as required for installation of equipment described herein.

M. The Contractor will test, label, and document all cables installed under this section of work.

N. The Contractor shall provide all programming required for Video Surveillance System.

O. The Division 26 scope of work will include the following:

1. Provision and installation of all AC power circuits, outlets and power panels.

P. The Division 28 05 29 scope of work will include the following:

1. Supply and installation of all cable tray, raceways, conduit, junction boxes, gang boxes, pull boxes and pull strings required for the specified system.

Q. The Division 28 05 14 scope of work will include the following:

1. Supply and installation of all low voltage cable required for the specified system except for those provided by the 27 15 00 contractor.

1.4 SYSTEM DESCRIPTION

A. Camera Recording Equipment

1. The cameras include internal storage. There is no additional onsite recording.
2. Video is archived to web servers provided by the camera manufacturer.

B. Cameras

1. Cameras will be required for locations as detailed in the design drawings.
2. Cabling and patch panels for cameras shall be provided under specification Section 27 15 00. Cabling for cameras shall be routed to the IDF Closet specified in the schedule on drawings DT601 and DT602 via conduit and/or the communications cable tray and terminated to patch panels.
3. The Contractor shall provide any patch cables required for the video surveillance system.

1.5 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division-1 Specification Sections.

1. Scope of Work: Vendor's narrative of services that will be provided to be submitted to Owner/Consultant before start of any work. Provide a complete understanding of Owner/Consultant's request for services. Include a time-line, information of on-site techs including their qualifications, and acceptance of this document and all that it entails and references.
2. Product Data: Submit manufacturer's product data sheets for each item of equipment in accordance with Part 1 of the project manuals indicating compliance with specified requirements. Any requests for substitutions of materials from manufacturers not represented in the design documents must be submitted and approved prior to submitting the Product data. Only specified or accepted manufacturers or suppliers products shall appear in the Product Data Submittal.
3. Shop Drawings: Indicate complete details and dimensions of work to be performed and indicate types and locations of equipment, fabricated equipment, and other details to completely describe work to be performed.
    a. There shall be no work authorized on site without the prior submittal of a complete set of shop drawings. Any exceptions to this must be in writing and approved by the Construction Manager.

b. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. Perform no portion of the work requiring submittal and review of shop drawings, product data, or samples until the respective submittal has been approved. Such work shall be in accordance with approved submittals.

c. By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents.

d. The Consultant's approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents. The contractor shall continue to be responsible for deviations from requirements of the original contract documents that are issued in writing as contract change directives (i.e. change orders, RFIs, CCDs, etc.)

e. The Consultant's review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The Consultant's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The Consultant's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

f. Illegible submittals will not be checked by the Consultant.

g. Details to include the following:
   1) Camera location, orientation, and mounting methods.
   2) Schematic Diagrams for all Systems, including all wiring labels.
   3) Schedule of Terminations for all systems.
   4) AC power schedule.

4. Bid Submittals:
   a. Contractor's Qualifications: Have previously installed at least 4 jobs of similar magnitude, completed within the last five years. Provide name and phone number of reference for each representative project. Identify at least one such completed job available for inspection by Consultant or Construction Manager.
   b. Bidder will confirm in writing that the firm has experience with equipment and systems of the types specified, that the firm maintains a fully staffed and equipped service facility, and that the firm is a franchised dealer and authorized service facility for the major brands specified, and that the firm is properly licensed to work in the project home State.
   c. Bidder will confirm in writing that any Sub-contractor firm has experience with equipment and systems of the types specified, that the Sub-contracting firm maintains a fully staffed and equipped service facility, and that the firm is a franchised dealer and authorized installer / service facility for the major brands specified, and that the firm is properly licensed to work in the project home State.

Bidding contractor will identify all Sub-contractors on the Bid Response team and a detailed scope of work for each Sub-contractor.

d. Provide resumes of project manager, lead engineer and lead installers working on this project. This will include key team members of any Sub Contractor. Resumes must be submitted with this bid response

e. Provide a Schedule of Values with unit prices for all systems. Schedule of Values will be used for any add or deduct Change Orders. Bid responses without Schedule of Values will be returned without review. Bidding Contractor will submit spreadsheet indicating manufacturers, model numbers, descriptions, total quantities, unit costs, and extended costs. Attach Schedule of Values at end of bid form.

f. Provide a schedule indicating durations for shop drawing submittal, lead times, procurement, and fabrication, shipping requirements, installation timelines for each major system and test and commissioning sessions. Coordinate these milestone dates with intended completion dates for this project.

1.6 CONTRACT CLOSEOUT SUBMITTALS

A. Comply with all requirements of Specification Division 1.

B. Keep a complete set of approved shop drawings on the job at all times. Non-approved shop drawings will not be allowed on the job site. Note any changes made during installation on a single set of drawings. This set of marked up drawings will not leave the jobsite until after the final system commissioning. All "as-built" drawings to be provided both in ACAD form (2018 or later) and in PDF.

C. System Reference Manual: Prior to Owner training, furnish 1 copy, in 3 ring binders, sized to hold the material plus 50% excess, with clear vinyl pockets on cover and spine for project title. Provide tabular dividers with permanent legends for the following sections:

1. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity. This procedure should describe the operation of all system capabilities. Assume the intended reader of the manual to be technically inexperienced and unfamiliar with this facility.
2. A list of all test results performed on the systems as outlined in Section 3.7, G proving the systems to be in full compliance.
3. A list of all equipment, indicating manufacturer, model, serial number, and equipment location (i.e. rack/room number). Update following acceptance testing, if changed.
4. A list of all settings of all semi-fixed controls. Update this document after the final acceptance testing.
5. All "as-built" drawings to be provided both in ACAD form (2018 or later) and in PDF.
6. Manufacturer's Instruction Manuals for all items of equipment, incorporating or followed by manufacturer's warranty statements. For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item.
7. Manufacturer's Service Manuals and parts list for all equipment. Photocopies are not acceptable. For custom circuits or modifications, complete schematics and parts lists.
8. Maintenance Instructions, including Contractor's maintenance phone number(s) and hours; maintenance schedule, description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
9. A legend of acronyms and abbreviations must accompany all documentation.
10. Replacement parts lists of major items of equipment.

11. Provide written report for dates of replacement of all batteries. This is to include UPS, and control systems.

D. Software Licensing and Manuals. Provide backup computer discs, all software manuals and license certificates for all software loaded on all PC's.

E. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor will certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

F. Provide a complete list of spares inventory to include quantity, manufacturer, model number, and serial number.

1.7 CODE COMPLIANCE

A. All work and materials shall comply with all applicable codes and regulations to meet or exceed Federal, State, City, and Local Building Codes and Regulations. Notify the Construction Manager if anything in the Plans or Specifications is out of compliance with codes and/or laws prior to bidding.

B. Comply with General Conditions and Section 01600/Materials and Equipment of CSI manual.

1.8 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify the Construction Manager in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The drawings diagrammatically show cabling, conduit, wiring, and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to the Consultant for approval, showing how the work may be installed.

1.9 GUARANTEES

A. The Contractor shall warrant new equipment to be free of defects in materials and workmanship for not less than one year after date of Substantial Completion. Defects occurring in labor or materials within one-year warranty shall be rectified by replacement or repair. Within the warranty period, provide answer to service calls and requests for information within a 24-hour period, and repair or replace any faulty item within a 72-hour period without charge, including parts and labor.

B. This warranty shall not void specific warranties issued by manufacturers for greater periods of time. Nor shall it void any rights guaranteed to the Owner by law.

C. Contractor to provide Owner with exact beginning and ending dates of the warranty period. Include the name of the person to call for service and telephone number. This information to be part of Project Record Set.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section will not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Construction Manager.

B. All devices and control stations will be UL Certified with attached identification label. If any equipment used is not UL Certified, then the Contractor will arrange onsite inspections and certification at no additional expense to the Owner.

2.2 ACCEPTABLE MANUFACTURERS

A. Provide equipment specified. Unless otherwise noted, substitutions will not be accepted.

B. If product is discontinued and/or no longer publicly advertised as a part of a manufacturer's current product line-up at time of installation, the project team reserves the right to request a substitution of product for new and currently offered product of like function fulfilling the design intent. Substitution value will be based on fair market value of original product at time of bid.

2.3 GENERAL

A. All equipment supplied will be new and meet the latest published specifications of that product. Take care during installation to prevent scratches, dents, chips, etc.

B. Delivery, Storage and Handling.

1. The contractor shall be responsible for safekeeping their materials and property, such as equipment and construction materials, on the job site. The owner assumes no responsibility for protection of above-named property against fire, theft, and environmental conditions.
2. Provide handling and shipping in accordance with manufacturer's recommendation.
3. Provide protective covering during construction to prevent damaging or entrance of foreign matter.
4. Replace at no expense to Owner, product damaged during delivery, storage or handling.

C. The installation contractor is required to use plenum rated cable in all plenum areas, underground rated cable for all underground cables, and riser rated cable in riser and/or non-plenum areas.

2.4 VIDEO SURVEILLANCE CAMERAS AND ASSOCIATED HARDWARE

A. Cameras.

1. Provide cameras as specified on drawings DT601 and DT602
2. Provide any required mounting hardware as per mounting details specified in schedules or shown in details on drawing DT501.

2.5 VIDEO SURVEILLANCE RECORDING / MANAGEMENT HARDWARE AND SOFTWARE

A. The specified cameras include internal storage. There is no additional onsite recording.

B. Surveillance Video is archived to web servers provided by the camera manufacturer.

C. Contractor shall integrate cameras added as part of this contract into the existing Library VMS dashboard.

D. VMS Camera Licenses.

1. Provide 5-Year Camera Cloud Licenses for all network cameras installed as part of this project.

2.6 SECURITY NETWORK SWITCHES

A. Switches shall be provided by Owners IT Dept.

2.7 CABLE, CONTROL WIRING & TERMINATIONS

A. Electrical conductors installed under this contract, except where otherwise specified, will be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper.

B. Refer to section 1.3 for Responsibility and Related Work.

C. Refer to Drawing DT501 for cable and accommodation details.

D. Connectors: All cable-mounted connectors will be covered by a connector hood or will have crimp ferrules, which securely grasp the cable outer jacket. All connectors will have incorporated a mechanical means of attaching the connector to its mate. Only connectors with tarnish resistant contact surfaces will be used.

E. Contractor will verify all connector details required for installation of equipment, including make, model, connector sex, attachment configuration, pin-outs, and cable clamp accessories.

F. All cables to be CMR or CMP rated, and use underground cables where required. If it is unclear what spaces are considered plenum, it is the contractor’s responsibility to inquire with the owner, architect, engineer or provincial officer(s).

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. When directed by the Construction Manager, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent, or to meet local codes.

C. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly and safely held in place.

D. Cover edges of cable pass-through holes in chassis, racks, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting. Adhesive-backed electrical tape and friction tape is not acceptable for insulating or protective purposes.

E. Inspect all racks, consoles, and enclosures prior to installation. All rough or sharp edges that may cause injury to personnel must be deburred or a permanent protective coating applied.

F. Install rack mounted equipment with black 10-32 Phillips head machine screws.

G. Panels or equipment mounted on the rear rack rails must not block access to any front mounted components. Front mounted equipment will be given ample space to allow for access to rear connection.

H. Provide security covers on non-user operated equipment having front panel controls. Install covers at the conclusion of Acceptance Testing.

I. AC Power and Grounding

1. Coordinate final connection of power and ground wiring to racks. Hardwire power wiring directly to power contacts or internal AC receptacles to ensure uninterrupted operation.
2. Install 3-conductor, 120 VAC outlets in each rack. Provide a minimum of two spare outlets in each rack. Label each outlet as to which AC circuit is feeding it and provide the same information in the circuit breaker panel.
3. Each equipment rack will have sufficient power outlets to provide an outlet for every power cord required by installed equipment or equipment designed for future installation, and at least one additional outlet for every eight rack units of panel mounting space.

3.2 STAFFING

A. The Contractor shall keep a qualified named foreman on-site and in charge of the work at all times. Such foreman shall be approved by the Construction Manager and will be replaced if the Construction Manager finds such foreman to be unsatisfactory.

B. Use craftsmen and installers possessing the necessary licenses and permits and skilled in their trade for all work.

C. The Contractor shall use only skilled, experienced and reliable workers and shall immediately discontinue the services of anyone employed on this project upon written request of the Owner or Construction Manager.

D. All crafts personnel shall be fully licensed and qualified to perform the work designated herein.

E. Contractor is responsible for providing installers with the required tools to perform each activity. Installers shall be adequately trained in the use of all tools prior to beginning work. Tools must be maintained in good working order. The Construction Manager reserves the right to review the tool lists and tool maintenance procedure of the Contractor. Tools deemed unserviceable by the Construction Manager shall be replaced immediately.

3.3 PROTECTION OF WORK AND PROPERTY

A. The Contractor shall assume full responsibility for any damage or defacement they cause to any other trades finished work and shall remedy any such damage or defacement at their own expense as required as soon as possible.

B. The Contractor shall perform daily clean-up of their own debris in their work area. All debris shall be placed in the containers and/or locations as directed by the Construction Manager.

C. Coordinate storage and work space requirements with the Construction Manager.

3.4 PRE-INSTALLATION SITE SURVEY

A. Prior to the start of systems installation, meet at the project site with the Construction Manager and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the Construction Manager shall be necessary to plan the crucial scheduled completions of the equipment rooms and telecommunications closets.

B. Confirm locations of plenum ceilings where CMP rated cables will be required.

3.5 CABLING

A. Take precautions to prevent and guard against electromagnetic and electrostatic hum.

B. Exercise care in wiring; damaged cables or equipment shall not be accepted. Isolate cables of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation. Keep wiring separated into groups for power circuits, video circuits and control/data circuits.

C. Wiring and connections will be completely visible and labeled in rack.

D. Run vertical wiring inside rack in properly sized plastic raceway with snap-on covers (Panduit Type E series.)

E. All power cables will run on the left side of the equipment rack, as viewed from the rear. All other cables will be run on the right side on the equipment rack, as viewed from the rear. Where signal cabling and any cabling types carrying power must cross, they will do so at right angles. Vertical wiring will be run with a bundling and support system, to maintain a clear and organized appearance.

F. Horizontally routed wiring to equipment will be neatly tied in manageable bundles with cable lengths cut to minimize excess but still allow ready access for service and testing. Provide horizontal support bars if cable bundles sag

G. For equipment mounted on slides, additional service loops will be provided to accommodate the full range of travel of the slides. This includes all power, ground, control and signal cables.

H. Neatly bundle excess AC power cables from rack-mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive

backed cable tie anchors are not acceptable. Cable tie and lacing installation will be accomplished using hand tools specifically designed to apply proper tension to the cable tie, and to cut it off flush with no protruding sharp edges. Cable ties will not be applied with excessive force, which may damage or deform sensitive and fragile cables.

I. Exercise care in wiring; damaged fiber, cables or equipment shall not be accepted.

J. All wiring in publicly accessible spaces shall be concealed in walls. Alternatively, surface mounted raceway systems may be used. The method of wiring shall be proposed to the owner and approval must be granted prior to proceeding with the work.

K. Protect all cable from physical damage. Maintain proper radius per manufacturer's requirements. Support riser cable uniformly per manufacturer's requirements to prevent undue stress on cable or bends.

L. Unless otherwise noted, all cables shall be routed through the building cable tray/conduit system. Refer to the Data drawings for the layout of the conduits and cable tray.

M. All backbone cables shall be CMR, MPR, OFNR, or OFCR rated. Cables suitable for use in air plenums, and which meet the electrical/transmission specifications, are also acceptable for riser applications.

N. Cables routed entirely within individual telecommunications rooms and not within air plenums shall be CM, CMG, MP, MPG, OFN, OFNG, OFCG or OFG rated as a minimum. Cables suitable for use in air plenums and riser applications, and which meet the electrical/transmission specifications, are acceptable substitutes.

O. If at any time during the job the cable tag becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a duplicate pre-printed cable tag at the Contractor's expense.

P. Twisted pair metallic cables: Do not bend Category cables to a radius of less than eight (8) times the cable diameter.

Q. Cross-connect wire: Cable pair twists shall be maintained as close as practicable to the point of termination. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.

R. Cable tags shall be placed as per these specifications. Tags containing a unique cable ID designator shall be placed on both ends of all cables, 6 inches from the connector and/or terminal block. Also label all backbone cables passing through telecommunications rooms.

S. Location and placement of termination blocks, splice closures, splices and other distribution hardware shall be as shown on the Drawings or defined in the cable schedules.

3.6 LABELING

A. General

1. The attachment method for equipment identification plates will be designed for permanency unless otherwise described. All labels will be protected prior to installation, and will not be installed if damaged or scratched. Follow manufacturer's recommended procedure for surface preparation, which must be free of any dust, dirt or film. Wiping with a manufacturer-approved solvent is required. If a label is in a place that might be susceptible to damage, it will be protected with a layer of clear plastic, 1/16" or thicker, taped down. Internal labels will be replaced only if they become illegible. External labels will be replaced if they become scratched or marred.
2. On black lamicoid panels or pushbuttons, letters shall be white; on stainless steel or brushed natural aluminum plates, or light-colored pushbuttons, letters shall be black.
3. Embossed labels are not acceptable.
4. Mount labels in a neat, plumb and permanent manner except where indicated.
5. Text heights will be as follows:
    a. Rack designation labels will have 1" high block sans serif text.
    b. Equipment labels will be 3/4" high block sans serif text.
    c. Operator Control labels will be 1/4" high block sans serif text, this may be adjusted to fit available space.
    d. Panel labels will be 1/8" high block sans serif text.
    e. Patchbay, Cable and Connector labeling will be 10 point block sans serif text, this may be adjusted to fit available space.

B. Equipment Labels

1. Provide engraved lamicoid labels on the front and rear of active equipment mounted in racks. Front mounted equipment labels for the video monitor wall monitors are to be mounted with Velcro. Equipment labels to have one line of engraving, giving the schematic reference of the device, and/or its production function, i.e. "DDR #4", "MON #1".
2. Unless equipment manufacturer has clearly labeled functions, provide an engraved label over each user-operated control that describes the function or purpose of the control.
3. If the manufacturer provides a protected labeling strip such as those used for switcher control panels and patch bays, then patch/routing point labels may be typed clearly on 80 pound paper stock.

C. Cable Labels

1. Cables and wiring to be logically, legibly, and permanently labeled for easy identification. Labels on cables to be adhesive strip type covered with clear heat-shrink tubing. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style label. Hand-written or self-laminating type labels are not acceptable.
2. Wiring designations to be an alphanumeric code that is unique for each cable. Locate the cable designation at the start and end of each cable run and within 2 inches of the point of termination or connection. For cable runs that have intermediate splice points, the cable shall have the same designation throughout with an additional suffix to indicate each segment of the run. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings included with Project Record Drawings.
3. Provide adhesive labels on the rear of equipment where cables attach to indicate the designation of the cable connected at that point.

3.7 ACCEPTANCE

A. Provide a pre-commissioning systems report to the Consultant two weeks prior to the scheduled systems commissioning proving all systems to be in full compliance. Report shall include test results, date of each test, pertinent conditions such as control settings, etc., and test equipment employed. In addition, submit written notification that the installation has been completed in accordance with the requirements of the Contract Documents, and is ready for acceptance testing.

B. Acceptance testing will include operation of each major system and any other components deemed necessary. Contractor will assist in this testing and provide required test equipment. Contractor will provide at least two technicians familiar with installation, available for the entire testing period (day and night), to assist in tests, adjustments, and final modifications. Tools and material required to make any necessary repairs, corrections, or adjustments will be furnished by the Contractor. The Contractor will keep a running list of all acceptance tests performed and submit a final copy of the results with the closeout submittals as listed in Part 1.6. Testing process is estimated to take 2 days up to 10 hours per day and may require multiple crews / shifts.

C. During all consultant walkthroughs, the Contractor's project manager will be present.

D. If during acceptance testing it becomes evident that further adjustment or work may be required to bring the system into compliance, the Contractor will continue to work until the system is acceptable at no additional charge to the contract price. If approval is delayed because of defective equipment, poor installation, or failure of equipment to meet the requirements of these specifications, the Contractor will pay for additional time and expenses of the Consultant at the Consultant's standard rate in effect at that time, during any extension of the acceptance testing period. The Contractor will provide rental or loaner equipment to make the system operational in critical cases of equipment failure prior to contract completion.

E. Verify the following before beginning actual tests and adjustments on the system:

1. Electronic devices are properly grounded.
2. Powered devices have AC power from the proper circuit and hot, neutral, and ground conductors are connected correctly.
3. Insulation and shrink tubing are present where required.
4. Dust, debris, solder, splatter, etc. is removed.
5. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.

F. System Tests.

1. Video Signal Verification: From all cameras to all signal destinations. Verification of signal path and path integrity will be checked.
2. Control functions shall be checked for proper operation, from controlling devices to controlled devices.
3. Adjust, balance, and align equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and record these settings, in the "System Operation and Maintenance Manual".
4. Installed and loose equipment shall be inventoried for correct quantity.
5. Any other test on any piece of equipment or system deemed appropriate by Consultant.

6. The omission of a description of a device, function, signal path, or test in this document shall not exempt the Contractor from responsibility for checking all devices and signal paths for appropriate compliance with Industry Performance Standards and making corrections necessary to bring system(s) into compliance with the applicable standards.
7. Test all data cables for length, impedance, resistance, capacitance, attenuation, next loss and inverted pairs with a Fluke CableIQ tester or approved equal. All points shall pass the test for Category standard of cable installed. Submit printed test data to the Construction Manager at least 7 days prior to connection of system equipment. All testing shall comply with TIA/EIA TSB 67 Standards.
8. Paired and multi-conductor metallic cables:
    a. After terminating the cables, test all cable pairs for continuity, ground fault, proper cross-connection, shorts and crossed pairs.

9. Recommended test equipment (obtain approval of Construction Manager and Consultant prior to using substitute test equipment):
    a. Fluke CableIQ
    b. Ideal SignalTek II
    c. ByteBrothers Low Voltage Pro

10. In the event that test results are not satisfactory, the contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests which disclosed faulty or defective material, equipment, or installation method, and shall perform additional tests as the Consultant deems necessary.

3.8 TEST EQUIPMENT

A. Provide the following equipment on site for final acceptance testing. Test equipment to be available for the entire period through final system acceptance. Prior to start of testing, provide a list to the Consultant of test equipment make and model numbers that will be used.

B. Megohmeter.

1. Multimeter: Measurement range, DC to 20,000 Hz, 100 mV to 300 V, 10 ma to 10A. Acceptable: Fluke 75.
2. CAT6 cable tester: Acceptable:
    a. Fluke CableIQ
    b. Ideal SignalTek II
    c. ByteBrothers Low Voltage Pro

3.9 INSTRUCTION OF OWNER PERSONNEL

A. Upon completion of the installation of the specified systems, and prior to any facility events, provide designated operating personnel training on the equipment operation. This training will be performed at the site by the Contractor's and the manufacturer's education staff.

B. The System Reference and Service Manuals must be complete and on-site prior to the time of the first instruction.

C. Coordinate schedule of instruction with the Owner subject to availability of Owner's personnel. This may require scheduling instruction during weekends or evenings.

D. Training will be provided in a series of classes to operations personnel to review all aspects of operation and maintenance of the system. Follow-up sessions to better enhance the operator's ability to expand or maximize the system will be made available.

E. The system training will include one (1) days or eight (8) hours of technical training covering the explanation of the system, including documentation, configuration, interfacing and diagnostics. Provide training of the video system operators and maintenance personnel as follows:

1. System Overview: Explanation of system includes documentation, configuration, interfacing and basic diagnosis.
2. Operator Training General: Basic training in the use of system devices including badging, monitoring, recording and general operation of overall system.
3. Operator Training Specific: Advanced training in use of system devices including terminal equipment, signal routing, monitoring, recording, etc.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction, 2018 edition, including the 2012 Regional Supplement Amendments, herein referred to as "Standard Specifications".

C. San Diego Regional Standard Drawings, 2016 edition herein referred to as “Standard Drawings”

D. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses and exterior plants.
2. Excavating and backfilling for buildings and structures.
3. Subbase and base course for asphalt paving.
4. Subsurface drainage backfill for walls and trenches.
5. Excavating and backfilling for utility trenches.
6. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

B. Related Sections include the following:

1. Division 1 Section "Construction Progress Documentation" for recording pre-excavation and earthwork progress.
2. Division 1 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
3. Division 32 Section "Landscape Planting" for finish grading, including preparing and placing topsoil and planting soil for lawns, planting bed establishment, and tree and shrub pit excavation and planting.
4. Division 3 Section "Cast-in-Place Concrete" for granular course if laced over vapor retarder and beneath the slab-on-grade.

5. Divisions 22, 23 and 26 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unratified masses, conglomerate deposits, and boulders of rock material 314 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency~ according to ASTM D 1586.

I. Structure: Building, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.
2. Geotextile fabric for bioswale and foundation drain.
3. Controlled low-strength material, including design mixture.

B. Material Test Reports: From a testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow soil material proposed for fill and backfill.

C. Pre-excavation Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

D. Survey verification of finished pad elevations prior to the construction of slabs on grade.

1.5 QUALITY ASSURANCE

A. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018 takes precedence over these specifications.

B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving the facility OCCUPIED by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Architect not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations. Subcontractor shall make interpretations of the geotechnical report for determining the need for import soils, screening, etc. Subcontractor shall make said interpretation at subcontractor’s sole risk.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, ,vegetation, and other deleterious matter. Pursuant to the Soils Report, imported fill used for satisfactory soils should have an expansion index less than 30, plasticity index not less than 15, percent passing No. 200 sieve less than 30, percent retaining on ¾ inch sieve less than 30.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, Ml, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefin or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf ASTM D 4632.
3. Sewn Seam Strength: 142 lbf ASTM D 4632.
4. Tear Strength: 56 lbf: ASTM D 4533.
5. Puncture Strength: 56 lbf; ASTM D 4833
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.

7. Permittivity: 0.5 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect and maintain erosion and sedimentation controls, which are identified in the Erosion Control Plans prepared by Latitude 33.

3.2 DEWATERING

A. Prevent surface water and groundwater from entering excavations, from ponding on prepared sub-grades, and from flooding project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

C. Re-route surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
   a. 24 inches outside of concrete forms other than at footings.
   b. 5 feet outside of building footprints.
   c. 6 inches outside of minimum required dimensions of concrete cast against grade.
   d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
   e. 6 inches beneath bottom of concrete slabs on grade.
   f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch if applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

A. Notify Geotechnical Inspector when excavations have reached required subgrade.

B. If Geotechnical Inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Geotechnical Inspector, without additional compensation.

3.9 UNATHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi may be used when approved by Geotechnical Inspector.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Geotechnical Inspector.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpiles borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, damp-proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud or frost.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud or frost.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section “Cast-in-Place Concrete.”

D. Onsite fill soils are not anticipated to meet the requirements of bedding material. Sand should be placed in a zone that extends a minimum of 6 inches below and 12 inches above the pipe for the full trench width. The bedding material should be compacted to a minimum of 90 percent of the maximum dry density as obtained by a modified Proctor compaction procedures. Trench backfill above pipe bedding may consist of approved, onsite or import soils placed in lifts no grated than 8 inches loose thickness and compacted to at least 90 percent of the maximum dry density. Jetting of pipe bedding or trench backfill materials is not permitted. In landscape areas, the compaction requirements of backfill above the pipe zone may be reduced to at least 85 percent of maximum density.

E. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or Conduit. Coordinate backfilling with utilities testing.

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

G. Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage an independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design-bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 6938, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris

END OF SECTION 310000

SECTION 31 10 00

SITE CLEARING – GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site clearing of designated site improvements and landscaping.

B. Tagging of vegetation and items to remain after site clearing.

1.2 RELATED SECTIONS

A. Section 31 20 00 - Earth Moving.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals.

B. Clearing Plan: Submit list of proposed operations, and identify site improvements and features to remain. Include proposed location for stockpiles.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: N/A

1.5 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.6 SEQUENCING

A. Ensure that work of this section is performed in time to prevent interruption of construction progress.

PART 2 -- PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Grading Contractor to determine

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Site Clearing Materials Suitable for Site Conditions:
1. Tree protection.
2. Erosion control.
3. Siltation control.
4. Dust control materials.

PART 3 -- EXECUTION

3.1 SITE CLEARING OPERATIONS

A. Protection of existing trees, vegetation, landscaping, and site improvements not scheduled for clearing which might be damaged by construction activities.

B. Trimming of existing trees and vegetation as recommended by arborist for protection during construction activities.

C. Clearing and grubbing of stumps and vegetation, and removal and disposal of debris, rubbish, designated trees, and site improvements.

D. Topsoil stripping and stockpiling.

E. Temporary erosion control, siltation control, and dust control.

F. Temporary protection of adjacent property, structures, benchmarks, and monuments.

G. Temporary relocation of play structures, fencing, and site improvements scheduled for reuse.

H. Watering of trees and vegetation during construction activities.

I. Removal and legal disposal of cleared materials.

3.2 CLEARING

A. Prevent damage to existing improvements indicated to remain, including improvements on and off site. Protect existing trees and vegetation indicated to remain. Do not stockpile materials and restrict traffic within drip line of existing trees to remain. Provide and maintain temporary guards to encircle trees or groups of trees to remain; obtain approval before beginning work.

B. Water vegetation as required to maintain health. Cover temporarily exposed roots with wet burlap and backfill as soon as possible. Coat cut plant surfaces with approved emulsified asphalt plant coating.

C. Repair or replace vegetation, which has been damaged, or pay damages. Remove heavy growths of grass before stripping. Stockpile satisfactory topsoil containing no large stones,

foreign matter and weeds on site for reuse.

D. Completely remove all improvements including stumps and debris except for those indicated to remain. Remove below grade improvements at least 12" below finish grade and to the extent necessary so as not to interfere with new construction. Remove abandoned mechanical and electrical work as required.

E. Prevent erosion and siltation of streets, catch basins and piping. Control windblown dust. Remove waste materials and unsuitable soil from site and dispose of in a legal manner.

END OF SECTION 311000

SECTION 31 20 00

EARTHMOVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction, 2018 edition, including the 2012 Regional Supplement Amendments, herein referred to as "Standard Specifications".

C. San Diego Regional Standard Drawings, 2016 edition herein referred to as “Standard Drawings”

D. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses and exterior plants.
2. Excavating and backfilling for buildings and structures.
3. Subbase and base course for asphalt paving.
4. Subsurface drainage backfill for walls and trenches.
5. Excavating and backfilling for utility trenches.
6. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

B. Related Sections include the following:

1. Division 1 Section “Construction Progress Documentation” for recording pre-excavation and earthwork progress.
2. Division 1 Section “Temporary Facilities and Controls” for temporary controls, utilities, and support facilities.
3. Division 32 Section “Soil Preparation” and “Plants” for finish grading, including preparing and placing topsoil and planting soil for lawns, planting bed establishment, and tree and shrub pit excavation and planting.
4. Division 3 Section “Cast-in-Place Concrete” for granular course if laced over vapor retarder and beneath the slab-on-grade.

5. Divisions 22, 23, and 26 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: backfill placed beside and over pipe in a trench, including hauches to support side of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed over the excavated subgrade in a trench before laying pipe.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to contract provisions and unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 314 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency ~ according to ASTM D 1586.

I. Structure: Building, footings foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.
2. Geotextile fabric for bioswale and foundation drain.
3. Controlled low-strength material, including design mixture.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow soil material proposed for fill and backfill.

C. Preexcavation Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

D. Survey verification of finished pad elevations prior to the construction of slabs on grade.

1.5 QUALITY ASSURANCE

A. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018 takes precedence over these specifications.

B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section “Project Management and Coordination.”

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving the facility OCCUPIED by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Architect not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect’s written permission.
3. Contact utility-locator services for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available for excavations. Subcontractor shall make interpretations of the geotechnical report for determining the need for import soils, screening, etc. Subcontractor shall make said interpretation at subcontractor's sole risk.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Pursuant to the Soils Report, imported fill used for satisfactory soils should have expansion index less than 30, plasticity index not less than 15, percent passing No. 200 sieve less than 30, percent retaining on ¾ inch sieve less than 30.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, MI, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefin or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf ASTM D 4632.
3. Sewn Seam Strength: 142 lbf ASTM D 4632.
4. Tear Strength: 56 lbf: ASTM D 4533.
5. Puncture Strength: 56 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.5 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning tape: Acid – and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect and maintain erosion and sedimentation controls, which are identified in the Erosion Control Plans prepared by Latitude 33.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of

surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

    a. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
    b. 24 inches outside of concrete forms other than a footings.
    c. 5 feet outside of building footprints.
    d. 6 inches outside of minimum required dimensions of concrete cast against grade.
    e. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    f. 6 inches beneath bottom of concrete slabs on grade.
    g. 6 inches beneath pipe in trenches and greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch if applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

    1. Excavations for Footings and Foundations: Do not disturb bottom of excavations. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to require lines and grades to leave solid base to receive other work.
    2. Excavation for Underground basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe

or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

A. Notify Geotechnical Inspector when excavation have reached required subgrade.

B. If Geotechnical Inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a load 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architects, and replace with compacted backfill or fill as directed.

D. Authorized additional excavated and replacement material will be paid for according to contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activates, as directed by Geotechnical Inspector, without additional compensation.

3.9 UNATHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi may be used when approved by Geotechnical Inspector.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Geotechnical Inspector.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpiles borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpiles soil materials away from edge of excavations. Do not store within drip line of remaining trees

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grading including, where applicable, subdrainage, drampproofing, waterproofing, and perimeter insulation
2. Surveying locations of underground utilities for record documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud or frost.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud or frost.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section “Cast-in-Place Concrete.”

D. Onsite fill soils are not anticipated to meet the requirements of bedding material. Sand should be placed in a zone that extends a minimum of 6 inches below and 12 inches above the pipe for the full trench width. The bedding material should be compacted to a minimum of 90 percent of the maximum dry density as obtained by a modified Proctor compaction procedures. Trench backfill above pipe bedding may consist of approved, onsite or import soils placed in lifts no grated than 8 inches loose thickness and compacted to at least 90 percent of the maximum dry density. Jetting of pipe bedding or trench backfill materials is not permitted. In landscape areas, the compaction requirements of backfill above the pipe zone may be reduced to at least 85 percent of maximum density.

E. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of

piping or Conduit. Coordinate backfilling with utilities testing

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing

G. Place and compact final backfill of satisfactory soil to final subgrade elevation

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to preform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design-bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 6938, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris

B. Repair and reestablish grades to specified tolerances where completed or partially completed

surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owners property. Stockpile or spread soil as directed by Architect.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owners property.

END OF SECTION 312000

SECTION 31 23 00

EXCAVATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work includes: Provide earthwork operations for excavating, backfilling, and compacting trenches for installation of water, sewer, subdrain, storm drain, appurtenances, and structures; shoring of trench and structure excavations; removing and disposing of unsuitable materials; and restoring surfaces as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Work:

1. Related work specified in other sections of these Specifications:

i.	Earthwork	Section 31 00 00
ii.	Water Distribution	Section 33 10 00
iii.	Storm Drain System	Section 33 40 00
iv.	Sanitary Sewage System	Section 33 30 00
v.	Mechanical	Division 23
vi.	Electrical	Division 26

1.2 REFERENCE STANDARDS

A. ASTM D 1557 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. (4.54 kg) Rammer and 18-inch (457 mm) Drop.

B. San Diego Regional Standard Drawings, 2016 Edition, herein referred to as "Standard Drawings".

C. NFPA 24 National Fire Code, Installation of Private Fire Service Mains and Their Appurtenances.

D. Erosion Control Plans prepared by Latitude 33.

E. All work within a public right of way, alleys and public utility easements must comply with the approved City of Santee Amended and Modified details of the Standard Drawings and the Standard Drawings and the following Standard Specifications

F. Standard Specifications for Public Works Construction, 2015 edition, including the 2012 Regional Supplement Amendments, herein referred to as "Standard Specifications".

G. Manual of Traffic Controls for Construction and Maintenance Work Zones, California Department of Transportation, latest edition, herein referred to as "Traffic Control Manual".

H. ADS installation Specifications for N-12® WT IB High Density Polyethylene Pipe

I. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018

1.3 QUALITY ASSURANCE

A. Testing

1. Soils testing for engineering control of the trench backfill and compaction will be under the direction of the Geotechnical Inspector. Trench backfill and compaction shall be subject to field inspection and testing.
2. Developer will retain and pay for the services of a Geotechnical Consultant/Testing Agency. The Geotechnical Consultant will be afforded the opportunity to test representative samples of material to be used for trench backfill to insure compliance of the work to these Specifications.
3. The Geotechnical Consultant shall be afforded the opportunity to perform soil tests without interference from Contractor's forces and equipment.
4. Geotechnical Inspector will advise Contractor if test results indicate unsatisfactory backfill material or that the density of any layer of backfill or portion thereof is below the specified density.

B. Certification

1. Upon completion of the work, Contractor shall certify in writing that utility trench excavation, backfill, and compaction was performed in accordance with these Specifications and as shown on Drawings.

1.5 SITE CONDITIONS

A. Records of Investigations

1. Refer to “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018 for information regarding soil and subsurface investigations.

B. Existing Conditions and Monumentation

1. Verify existing grades and dimensions before starting utility trench excavation operations. Notify Contractor and Engineer of Record if any discrepancy exists.
2. Protect features, facilities, or items shown or designated on Drawings to protect in place or by others.
3. Protect and maintain bench marks throughout the course of the work. Re-establish disturbed or destroyed monuments or stakes, resulting from the work, at no additional

cost to Developer.

1.6 PROTECTION AND SAFETY

A. General

1. Conduct operations to insure safety of persons and to prevent damage to existing structures and utilities, construction in progress, and other property. Move materials to stockpile or disposal areas in a manner to insure minimum interference with operations of others, private and public. Do not close or obstruct roads, walks, and other facilities occupied and used by Owner or the public without prior written permission.
2. All work shall meet or exceed all Cal-OSHA requirements.

1.7 SCHEDULING

A. Inclement Weather

1. Cease backfilling and compacting operations when incorporation of excess water into the backfill material could occur because of inclement weather.
2. Do not place backfill material over subgrade that is covered with water. Rework subgrade as necessary to achieve near optimum moisture content prior to resuming placement and compaction of backfill material following a period of inclement weather.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Bedding

1. Onsite soils are not anticipated to meet the requirement for bedding material.

2. Onsite pipe bedding should consist of sand or similar granular material having a minimum san equivalent value of 30 and extend a minimum of 6 inches below and 12 inches above the pipe for the full trench width.

3. Pipe bedding within a public right-of-way shall meet requirements of the Standard Specifications

4. Provide pipe zone bedding material of the type and size shown on the Drawings, as specified by the Standard Drawings, or as directed by the Geotechnical Inspector.

5. Bedding material shall not be water densified or jetted prior to backfilling.

6. In landscape areas, the compaction requirement of backfill above the pipe zone may be reduced to at least 85 percent of maximum density.

B. Backfill

1. Soils resulting from excavation may be used as trench backfill above the pipe zone provided the material has no more than 30 percent retained on a ¾ inch sieve.

2. If the removal of oversize material from the excavated soils proves to be difficult, the following alternative recommendations may be adopted for trench backfill above the pipe zone
3. Import soils meeting the requirements presented in Section “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018
   a. Import soils meeting the requirements presented in Section “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018 may be used for trench backfill in lieu of using the onsite-excavated soils containing significant amounts of oversized material
   b. Trench backfill excavations may be backfilled with a lean concrete slurry (typically a 1- or 2-sac cement/sand mix).

4. Backfill for pipe installation and structures shall be granular material approved for use as backfill material by the Geotechnical Inspector.
5. Compact all types of backfill by mechanical means. Flooding and jetting of backfill shall not be permitted.
6. Compact backfill to meet requirements specified in Article 3.2 below

2.2 LOCATOR TAPE

A. Locator tape shall be color coded and labeled, acid and alkali-resistant polyethylene film. The tape shall be manufactured with integral wires, foil backing, metallic core, or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep, and specifically manufactured for marking and locating underground utilities.

1. Water: 6-inch width, color-blue, marking "Caution-Water Line Buried Below"; Terra Tape, Paul Potter #AL-6100BW; Seton No. 6WAT; or equal.
2. Sewer: 6-inch width, color-green, marking "Caution-Sewer Line Buried Below"; Seton No. 6SEW, Allen Systems, or equal.
3. Storm drain: 6-inch width, color-yellow, marking "Caution - Pipeline Buried Below"; Seton No. 6 PIP, Allen Systems, or equal.

PART 3 – EXECUTION

3.1 EXCAVATION

A. General

1. Perform excavation of every description and of whatever materials encountered, to the depths indicated on the Drawings or as necessary.
2. Dispose of excavated materials not required or suitable for backfill (as reviewed by the Geotechnical Consultant), as directed by Geotechnical Inspector.
3. Perform such grading as may be necessary to prevent surface water from flowing into the trenches.
4. Provide adequate equipment for removal of storm or subsurface waters which may accumulate in excavated areas. If subsurface water is encountered, utilize approved means to dewater the excavation so that it will be dry for working and pipe laying. Storm or subsurface water allowed to enter potable water pipe may result in rejection of the pipe should the pipe become contaminated.
5. Excavation for cleanouts, manholes, catch basins, inlets, or similar structures shall be sufficient to leave at least twelve (12) inches clear between the outer structure surfaces and the face of the excavation.

B. Trenching

1. Grade bottom of trenches to provide uniform bearing on undisturbed soil for the full length of each section of pipe.
2. The width of the trench, at and below the top of the pipe, shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed eight (8) inches on either side of the pipe. The width of trench above the top of pipe may be wider if necessary.
3. Water Piping: Install without pockets and bed pipe for uniform and continuous support with compacted backfill in accordance with ASTM D-2774 and manufacturer's recommendations.

4. Fill over-depth excavations with approved bedding material compacted to required grades.

C. Unsuitable Subgrade

1. If the subgrade material under the pipe or a structure is unsuitable, remove the unsuitable material as directed by the Geotechnical Consultant and backfill the over-depth excavation with 1-inch crushed rock meeting the requirements of Subsection 200-1.2 of the Standard Specifications.
2. Where rock is encountered during trenching operations, over-excavate the trench to provide a minimum of 3 inches clearance between the pipe bells and the rock. Backfill this over-depth excavation as specified above.

3.2 COMPACTION REQUIREMENTS

A. Bedding
   1. Compact bedding material by mechanical means. Compaction equipment used shall not result in damage to adjacent ground, existing improvements, or the work of this Contract.
   2. Compact bedding material to a minimum relative compaction of 90 percent except that for storm drain pipe (AASHTO M304) bedding material shall be compacted to 95% from trench bottom to springline of pipe.

B. Backfill
   1. Compact trench backfill material in accordance with Subsection 306-1.3.2 of the Standard Specifications, unless otherwise specified in this Section.
   2. Compaction equipment shall be of a size and type approved by Geotechnical Inspector.
   3. Place all backfill material in layers which, prior to compaction, shall not exceed maximum thickness of 8 inches.

3.3 BACKFILLING

A. Procedure for Pipe Trench

   1. Except for water distribution pipe and fire service mains, backfill pipe trenches immediately after installation and inspection of pipe and the recordation and verification of as-built elevations and dimensions to preclude damage to the installed pipe. Initial pressure test of water distribution pipe and fire service mains, with all joints visible and pipe center loaded, shall be conducted prior to backfill. Installation and testing of fire service mains shall meet the requirements of NFPA 24.
   2. Place bedding around pipe so as not to displace or damage the pipe.
   3. Carry bedding up symmetrically on each side of the pipe to one (1) foot above the pipe top. Material shall be sand or selected granular material, free from rocks or lumps exceeding 1 inch in any dimension.
   4. Compact each layer of bedding before placing backfill material.
   5. Backfill the remaining trench depth to the surface of the subgrade with approved granular material that is free from rocks and lumps exceeding 3 inches in any dimension. Place backfill material in separate layers of maximum loose thickness as specified and compact each layer to the minimum relative compaction specified before placing additional backfill material.

B. Procedure for Structures

   1. Place structure backfill immediately after inspection of the structure by the Geotechnical Inspector and obtaining approval for backfilling.
   2. Place structure backfill in separate layers of maximum loose thickness as specified and compact each layer to the minimum relative compaction specified before placing additional backfill material.
   3. Continue the structure backfill operation in layers, as specified above, until the

backfill has been brought to the finish slopes and grades shown on the Drawings.

3.4 UNSUITABLE BACKFILL MATERIAL

A. Remove material from utility trench and structure excavations, determined unsuitable for use as backfill, from the project site and dispose of such unsuitable material in an authorized manner.

3.5 SHEETING AND SHORING

A. Design and Construction

1. Provide adequate sheeting, shoring, bracing, or equivalent method for worker protection in accordance with CAL/OSHA requirements.
2. Construct, maintain, and remove sheet piling and shoring in a manner to prevent caving of the excavation walls or imposing a load on the pipe.
3. Remove sheeting and shoring completely, unless permission has been obtained from Owner's Representative to leave certain portions in place.

3.6 LOCATOR TAPE INSTALLATION

A. Place locator tape for sewer, water and storm drain non-metallic piping a minimum of 12 inches and a maximum of 36 inches below finish grade. Locator tape shall be placed during trench backfilling operations.

B. Place locator tape 12 inches above the top of piping.

C. Install locator tape to a point not less than 5 feet from the outside face or limit line of any building.

3.7 TRENCHING CONTROLS

A. Verify, before trenching, the horizontal location and depths of all utility lines within the area.

B. Reconstruct, repair, or replace all pavements, sidewalk, landscape, and other items damaged due to work under this contract to the satisfaction of Developer.

C. Arrange for the marking of utility lines in areas of trenching or excavation operations, prior to commencing such operations.

D. Trench plates must be in place at the end of each work day until all open trenches have been backfilled.

3.8 FIELD QUALITY CONTROL: DENSITY TESTING

A. General

1. Testing will be done by the Developer and costs of initial testing will be paid by Developer. Cost of all subsequent testing necessary due to non-compliance with

specifications shall be paid by Contractor.

B. Density Tests

1. Tests shall be performed in accordance with the referenced Standards.
2. Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D 1557, Method B or D. A minimum of one test shall be performed for each 200 lineal feet, for each different type of material used for backfill.
3. Field in-place density shall be determined in accordance with ASTM Test Method D 1556, and field in place moisture content shall be determined in accordance with ASTM Test Method D 3017.
4. Trenches improperly compacted shall be reopened to the depth directed, then backfilled and compacted to the density specified, at no additional cost to Developer.

3.9 EXISTING UTILITIES

A. Existing utilities are shown from available records and the accuracy of their location cannot be guaranteed. The contractor shall pothole as necessary to locate horizontally and vertically all existing utilities. Any discrepancy with the plans shall be reported immediately to the architect. The contractor shall be responsible for all costs due to discrepancies in the location of existing utilities if the contractor fails to pothole and notify the architect prior to stat of construction.

B. Abandoned utilities encountered during all construction operations shall be removed and capped as required to complete all work shown on the plans.

C. Live utilities shall remain in service at all times unless otherwise noted. Contractor shall reroute utilities as required such that existing facilities remain operational.

END OF SECTION 312300

SECTION 31 23 16.13

UTILITY TRENCHES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work includes: Provide earthwork operations for excavating, backfilling, and compacting trenches for installation of water, sewer, subdrain, storm drain, appurtenances, and structures; shoring of trench and structure excavations; removing and disposing of unsuitable materials; and restoring surfaces as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Work:

1. Related work specified in other sections of these Specifications:

Earthwork	Section 31 00 00
Water Utilities	Section 33 10 00
Storm Drain System	Section 33 40 00
Sanitary Sewage System	Section 33 30 00
Mechanical	Division 23
Electrical	Division 26

1.2 REFERENCE STANDARDS

A. ASTM D 1557 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. (4.54 kg) Rammer and 18-inch (457 mm) Drop.

B. City of San Diego Standard Drawings, 2016 edition, herein referred to as "Standard Drawings".

C. NFPA 24 National Fire Code, Installation of Private Fire Service Mains and Their Appurtenances.

D. Storm Water Pollution Prevention Plan prepared by Latitude 33 dated June 14, 2018, and Erosion Control Plans dated June 12, 2018.

E. All work within a public right of way, alleys and public utility easements must comply with the approved City of San Diego drawings which reference Standard Drawings of the City of San Diego and the following Standard Specifications

F. Standard Specifications for Public Works Construction, 2018 edition, including Regional Supplement Amendments and the City of San Diego Supplement Amendment, herein referred to as "Standard Specifications".

G. Manual of Traffic Controls for Construction and Maintenance Work Zones, California

Department of Transportation, latest edition, herein referred to as "Traffic Control Manual".

H. 1999 Standard Special Provisions for Signals, Lighting and Electrical Systems of the City of San Diego.

I. ADS installation Specifications for N-12® WT IB High Density Polyethylene Pipe

J. "Update Geotechnical Report, Aperture" prepared by Geocon Geotechnical dated March 30, 2018

1.3 DEFINITIONS

A. Compaction - densification of a soil material by mechanical means.

B. Maximum Density - standard laboratory test for maximum dry unit weight. Unless otherwise specified, the maximum dry unit weight shall be determined in accordance with ASTM Method of Test D 1557.

C. Optimum Moisture - test moisture content at the maximum density.

D. Relative Compaction - the degree of compaction (expressed as a percentage) of dry unit weight of a material as compared to the maximum dry unit weight of the material. Field testing should conform to ASTM Method of Test D 1556, D 2922 and/or D 3017.

E. Geotechnical Consultant - the Geotechnical Engineering and Engineering Geology consulting firm retained by the Owner to provide technical services for the project. Observations by the Geotechnical Consultant include observations by the Soil Engineer, Geotechnical Engineer, Engineering Geologist and those performed by persons employed by and responsible to the Geotechnical Consultant.

F. Finish Grade - the ground surface configuration at which time the surface elevations conform to the approved Drawings.

1.4 QUALITY ASSURANCE

"Update Geotechnical Report, Aperture" prepared by Geocon Geotechnical dated March 30, 2018 takes precedence over these specifications.

A. Testing

1. Soils testing for engineering control of the trench backfill and compaction will be under the direction of the Geotechnical Inspector. Trench backfill and compaction shall be subject to field inspection and testing.
2. Developer will retain and pay for the services of a Geotechnical Consultant/Testing Agency. The Geotechnical Consultant will be afforded the opportunity to test representative samples of material to be used for trench backfill to insure compliance of the work to these Specifications.
3. The Geotechnical Consultant shall be afforded the opportunity to perform soil tests without interference from Contractor's forces and equipment.

4. Geotechnical Inspector will advise Contractor if test results indicate unsatisfactory backfill material or that the density of any layer of backfill or portion thereof is below the specified density.

B. Certification

1. Upon completion of the work, Contractor shall certify in writing that utility trench excavation, backfill, and compaction was performed in accordance with these Specifications and as shown on Drawings.

1.5 SITE CONDITIONS

A. Records of Investigations

1. Refer to "Update Geotechnical Report, Aperture" prepared by Geocon Geotechnical dated March 30, 2018 for information regarding soil and subsurface investigations.

B. Existing Conditions and Monumentation

1. Verify existing grades and dimensions before starting utility trench excavation operations. Notify Contractor and Engineer of Record if any discrepancy exists.
2. Protect features, facilities, or items shown or designated on Drawings to protect in place or by others.
3. Protect and maintain bench marks throughout the course of the work. Re-establish disturbed or destroyed monuments or stakes, resulting from the work, at no additional cost to Developer.

1.6 PROTECTION AND SAFETY

A. General

1. Conduct operations to insure safety of persons and to prevent damage to existing structures and utilities, construction in progress, and other property. Move materials to stockpile or disposal areas in a manner to insure minimum interference with operations of others, private and public. Do not close or obstruct roads, walks, and other facilities occupied and used by Owner or the public without prior written permission.
2. All work shall meet or exceed all Cal-OSHA requirements.

1.7 SCHEDULING

A. Inclement Weather
   1. Cease backfilling and compacting operations when incorporation of excess water into the backfill material could occur because of inclement weather.
   2. Do not place backfill material over subgrade that is covered with water. Rework subgrade as necessary to achieve near optimum moisture content prior to resuming placement and compaction of backfill material following a period of inclement weather.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bedding
   1. Onsite soils are not anticipated to meet the requirement for bedding material.
   2. Onsite pipe bedding should consist of sand or similar granular material having a mini mum san equivalent value of 30 and extend a minimum of 6 inches below and 12 inches above the pipe for the full trench width.
   3. Pipe bedding within a public right-of-way shall meet requirements of the Standard Spec ifications
   4. Provide pipe zone bedding material of the type and size shown on the Drawings, as spec ified by the Standard Drawings, or as directed by the Geotechnical Inspector.
   5. Bedding material shall not be water densified or jetted prior to backfilling.
   6. In landscape areas, the compaction requirement of backfill above the pipe zone may be reduced to at least 85 percent of maximum density.

B. Backfill
   1. Soils resulting from excavation may be used as trench backfill above the pipe zone provided the material has no more than 30 percent retained on a ¾ inch sieve
      a) If the removal of oversize material from the excavated soils proves to be difficult, the following alternative recommendations may be adopted for trench backfill above the pipe zone
      b) Import soils meeting the requirements presented in Section 4.12 of the Geotechnical Investigation dated December 17, 2012 may be used for trench backfill in lieu of using the onsite-excavated soils containing significant amounts of oversized material
      c) Trench backfill excavations may be backfilled with a lean concrete slurry (typically a 1- or 2-sac cement/sand mix).
   2. Backfill for pipe installation and structures shall be granular material approved for use as backfill material by the Geotechnical Inspector.
   3. Compact all types of backfill by mechanical means. Flooding and jetting of backfill shall not be permitted.
   4. Compact backfill to meet requirements specified in Article 3.2 below

2.2 LOCATOR TAPE

A. Locator tape shall be color coded and labeled, acid and alkali-resistant polyethylene film. The tape shall be manufactured with integral wires, foil backing, metallic core, or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep, and specifically manufactured for marking and locating underground utilities.
   1. Water: 6-inch width, color-blue, marking "Caution-Water Line Buried Below"; Terra Tape, Paul Potter #AL-6100BW; Seton No. 6WAT; or equal.
   2. Sewer: 6-inch width, color-green, marking "Caution-Sewer Line Buried Below"; Seton No. 6SEW, Allen Systems, or equal.
   3. Storm drain: 6-inch width, color-yellow, marking "Caution - Pipeline Buried Below"; Seton No. 6 PIP, Allen Systems, or equal.

PART 3 - EXECUTION

3.1 EXCAVATION

A. General

1. Perform excavation of every description and of whatever materials encountered, to the depths indicated on the Drawings or as necessary.
2. Dispose of excavated materials not required or suitable for backfill (as reviewed by the Geotechnical Consultant), as directed by Geotechncial Inspector.
3. Perform such grading as may be necessary to prevent surface water from flowing into the trenches.
4. Provide adequate equipment for removal of storm or subsurface waters which may accumulate in excavated areas. If subsurface water is encountered, utilize approved means to dewater the excavation so that it will be dry for working and pipe laying. Storm or sub surface water allowed to enter potable water pipe may result in rejection of the pipe should the pipe become contaminated.
5. Excavation for cleanouts, manholes, catch basins, inlets, or similar structures shall be sufficient to leave at least twelve (12) inches clear between the outer structure surfaces and the face of the excavation.

B. Trenching

1. Grade bottom of trenches to provide uniform bearing on undisturbed soil for the full length of each section of pipe.

2. The width of the trench, at and below the top of the pipe, shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed eight (8) inches on either side of the pipe. The width of trench above the top of pipe may be wider if necessary.

3. Water Piping: Install without pockets and bed pipe for uniform and continuous support with compacted backfill in accordance with ASTM D-2774 and manufacturer's recommendations.

4. Fill over-depth excavations with approved bedding material compacted to require grades.

C. Unsuitable Subgrade

1. If the subgrade material under the pipe or a structure is unsuitable, remove the unsuitable material as directed by the Geotechnical Consultant and backfill the over-depth excavation with 1-inch crushed rock meeting the requirements of Subsection 200-1.2 of the Standard Specifications.

2. Where rock is encountered during trenching operations, over-excavate the trench to provide a minimum of 3 inches clearance between the pipe bells and the rock. Backfill this over-depth excavation as specified above.

3.2 COMPACTION REQUIREMENTS

A. Bedding

1. Compact bedding material by mechanical means. Compaction equipment used shall not result in damage to adjacent ground, existing improvements, or the work of this Contract.

2. Compact bedding material to a minimum relative compaction of 90 percent except that for storm drain pipe (AASHTO M304) bedding material shall be compacted to 95% from trench bottom to springline of pipe.

B. Backfill

1. Compact trench backfill material in accordance with Subsection 306-1.3.2 of the Standard Specifications, unless otherwise specified in this Section.

2. Compaction equipment shall be of a size and type approved by Geotechnical Inspector.

3. Place all backfill material in layers which, prior to compaction, shall not exceed maximum thickness of 8 inches.

3.3 BACKFILLING

A. Procedure for Pipe Trench

1. Except for water distribution pipe and fire service mains, backfill pipe trenches immediately after installation and inspection of pipe and the recordation and verification of as-built elevations and dimensions to preclude damage to the installed pipe. Initial pressure test of water distribution pipe and fire service mains, with all joints visible and pipe center loaded, shall be conducted prior to backfill. Installation and testing of fire service mains shall meet the requirements of NFPA 24.

2. Place bedding around pipe so as not to displace or damage the pipe.

3. Carry bedding up symmetrically on each side of the pipe to one (1) foot above the pipe top. Material shall be sand or selected granular material, free from rocks or lumps exceeding 1 inch in any dimension.

4. Compact each layer of bedding before placing backfill material.

5. Backfill the remaining trench depth to the surface of the subgrade with approved granular material that is free from rocks and lumps exceeding 3 inches in any dimension. Place backfill material in separate layers of maximum loose thickness as specified and compact each layer to the minimum relative compaction specified before placing additional backfill material.

B. Procedure for Structures

1. Place structure backfill immediately after inspection of the structure by the Geotechnical Inspector and obtaining approval for backfilling.

2. Place structure backfill in separate layers of maximum loose thickness as specified and compact each layer to the minimum relative compaction specified before placing additional backfill material.

3. Continue the structure backfill operation in layers, as specified above, until the backfill has been brought to the finish slopes and grades shown on the Drawings.

3.4 UNSUITABLE BACKFILL MATERIAL

A. Remove material from utility trench and structure excavations, determined unsuitable for use as backfill, from the project site and dispose of such unsuitable material in an authorized manner.

3.5 SHEETING AND SHORING

A. Design and Construction

1. Provide adequate sheeting, shoring, bracing, or equivalent method for worker protection in accordance with CAL/OSHA requirements.

2. Construct, maintain, and remove sheet piling and shoring in a manner to prevent caving of the excavation walls or imposing a load on the pipe.

3. Remove sheeting and shoring completely, unless permission has been obtained from Owner's Representative to leave certain portions in place.

3.6 LOCATOR TAPE INSTALLATION

1. Place locator tape for sewer, water and storm drain non-metallic piping a minimum of 12 inches and a maximum of 36 inches below finish grade. Locator tape shall be placed during trench backfilling operations.

2. Place locator tape 12 inches above the top of piping.

3. Install locator tape to a point not less than 5 feet from the outside face or limit line of any building.

3.7 TRENCHING CONTROLS

A. Verify, before trenching, the horizontal location and depths of all utility lines within the area.

B. Reconstruct, repair, or replace all pavements, sidewalk, landscape, and other items damaged due to work under this contract to the satisfaction of Developer.

C. Arrange for the marking of utility lines in areas of trenching or excavation operations, prior to commencing such operations.

D. Trench plates must be in place at the end of each work day until all open trenches have been backfilled.

3.8 FIELD QUALITY CONTROL: DENSITY TESTING

A. General

1. Testing will be done by the Developer and costs of initial testing will be paid by Developer. Cost of all subsequent testing necessary due to non-compliance with specifications shall be paid by Contractor.

B. Density Tests

1. Tests shall be performed in accordance with the referenced Standards.

2. Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D 1557, Method B or D. A minimum of one test shall be performed for each 200 lineal feet, for each different type of material used for backfill.

3. Field in-place density shall be determined in accordance with ASTM Test Method D 1556, and field in place moisture content shall be determined in accordance with ASTM Test Method D 3017.

4. Trenches improperly compacted shall be reopened to the depth directed, then backfilled and compacted to the density specified, at no additional cost to Developer.

3.9 EXISTING UTILITIES

1. Existing utilities are shown from available records and the accuracy of their location cannot be guaranteed. The contractor shall pothole as necessary to locate horizontally and vertically all existing utilities. Any discrepancy with the plans shall be reported immediately to the architect. The contractor shall be responsible for all costs due to discrepancies in the location of existing utilities if the contractor fails to pothole and notify the architect prior to stat of construction.

2. Abandoned utilities encountered during all construction operations shall be removed and capped as required to complete all work shown on the plans.

3. Live utilities shall remain in service at all times unless otherwise noted. Contractor shall reroute utilities as required such that existing facilities remain operational.

END OF SECTION 312316.13

SECTION 32 05 23

CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section shall cover site work concrete constructed upon the prepared subgrade and in conformance with the lines, grades, thickness, and cross sections shown on the Drawings. Construction shall include the following:

B. Curb, gutter, and combination curb and gutter.

C. Pedestrian Pavement: Walks, pedestrian crossings, wheelchair curb ramps and steps.

D. Vehicular Pavement: parking lots and loading docks.

E. Equipment Pads: transformers.

1.2 RELATED WORK

A. Section 01 33 00, SUBMITTALS.

B. Section 01 40 00, QUALITY REQUIREMENTS.

C. Section 03 30 00, CAST-IN-PLACE CONCRETE.

D. Section 05 50 00, METAL FABRICATIONS.

E. Section 31 00 00, EARTHWORK.

1.3 DESIGN REQUIREMENTS

A. Design all elements with the latest published version of applicable codes.

1.4 WEATHER LIMITATIONS

A. Hot Weather: Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Resident Engineer

1.5 SELECT SUBBASE MATERIAL JOB-MIX

A. The Contractor shall retain a testing laboratory to design a select sub-base material mixture and submit a job-mix formula to the Resident Engineer, in writing, for approval. The formula shall include the source of materials, gradation, plasticity index, liquid limit, and laboratory compaction curves indicating maximum density at optimum moisture. Cost of the testing laboratory to be included in the Contractor’s cost of project.

1.6 SUBMITTALS

Contractor shall submit the following:

A. Manufacturers' Certificates and Data certifying that the following materials conform to the requirements specified.
   1. Expansion joint filler
   2. Hot poured sealing compound
   3. Reinforcement
   4. Curing materials

B. Jointing Plan for all concrete areas.

C. Concrete Mix Design.

D. Concrete Test Reports

E. Construction Staking Notes from Surveyor.

F. Data and Test Reports: Select subbase material.

   1. Job-mix formula.
   2. Source, gradation, liquid limit, plasticity index, percentage of wear, and other tests as specified and in referenced publications.

1.7 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Refer to the latest edition of all referenced Standards and codes.

A. American Association of State Highway and Transportation Officials (AASHTO):

M147-65-UL.....Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses (R 2004)
M148-05-UL.....Liquid Membrane-Forming Compounds for Curing Concrete (ASTM C309)
M171-05-UL.....Sheet Materials for Curing Concrete (ASTM C171)
M182-05-UL.....Burlap Cloth Made from Jute or Kenaf and Cotton Mats

B. American Society for Testing and Materials (ASTM):

A82/A82M-07.....Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
A185/185M-07.....Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
A615/A615M-12.....Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement
A653/A653M-11.....Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process
A706/A706M-09b.....Standard Specification for Low Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
A767/A767M-09.....Standard Specification for Zinc Coated (Galvanized) Steel Bars for Concrete Reinforcement
A775/A775M-07b.....Standard Specification for Epoxy Coated Reinforcing Steel Bars
A820/A820M-11.....Standard Specification for Steel Fibers for Fiber Reinforced Concrete
C31/C31M-10 .....Standard Practice for Making and Curing Concrete Test Specimens in the field
C33/C33M-11a .....Standard Specification for Concrete Aggregates
C39/C39M-12 .....Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C94/C94M-12 .....Standard Specification for Ready Mixed Concrete
C143/C143M-10a .....Standard Test Method for Slump of Hydraulic Cement Concrete
C150/C150M-12 .....Standard Specification for Portland Cement
C171-07 .....Standard Specification for Sheet Materials for Curing Concrete
C172/C172M-10 .....Standard Practice for Sampling Freshly Mixed Concrete
C173/C173M-10b... .....Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
C192/C192M-07 .....Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
C231/C231M-10 .....Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C260/C260M-10a .....Standard Specification for Air Entraining Admixtures for Concrete
C309-11 .....Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
C494/C494M-12 .....Standard Specification for Chemical Admixtures for Concrete

C618-12 ..... Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
C666/C666M-03(2008)..... Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
D1751-04(2008)..... Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
D4263-83(2012)..... Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
D4397-10 ..... Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

C. American Welding Society (AWS):
D1.4/D1.4M (2005) ..... Structural Welding Code - Reinforcing Steel

PART 2 - PRODUCTS

2.1 GENERAL

A. Concrete Type: Concrete shall be as per Table 1 – Concrete Type, air entrained.

TABLE I – CONCRETE TYPE

	Concrete Strength		Non-Air-Entrained	Air-Entrained	
	Min. 28 Day Comp. Str. Psi (MPa)	Min. Cement lbs/c. yd (kg/m^3)	Max. Water Cement Ratio	Min. Cement lbs/c. yd (kg/m^3)	Max. Water Cement Ratio
Type A	5000 (35)[1,3]	630 (375)	0.45	650 (385)	0.40
Type B	4000 (30)[1,3]	550 (325)	0.55	570 (340)	0.50
Type C	3000 (25)[1,3]	470 (280)	0.65	490 (290)	0.55
Type D	3000 (25)[1,2]	500 (300)	*	520 (310)	*

1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 1200 psi (8.3 MPa) in excess of the compressed strength. For concrete strengths above 5000 psi (35 Mpa), the proposed mix design shall achieve a compressive strength 1400 psi (9.7 MPa) in excess of the compressed strength.
2. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
3. Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.

B. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

TABLE II – MAXIMUM SLUMP – INCHES (MM)

TYPE	MAXIMUM SLUMP*
Curb & Gutter	3 inches (75 mm)
Pedestrian Pavement	3 inches (75 mm)
Vehicular Pavement	2 inches (50 mm) (Machine Finished) 4 inches (100 mm) (Hand Finished)
Equipment Pad	3 to 4 inches (75 to 100 mm)
* For concrete to be vibrated: Slump as determined by ASTM C143. Tolerances as established by ASTM C94.	

2.2 REINFORCEMENT

A. The type, amount, and locations of steel reinforcement shall be as shown on the drawings and in the specifications.

2.3 SELECT SUBBASE (WHERE REQUIRED)

A. Subbase material shall consist of select granular material composed of sand, sand-gravel, crushed stone, crushed or granulated slag, with or without soil binder, or combinations of these materials conforming to AASHTO M147, as follows.

GRADE REQUIREMENTS FOR SOILS USED AS SUBBASE MATERIALS,
BASE COURSES AND SURFACES COURSES

AASHTO M147		Percentage Passing by Mass					
Sieve	Size	Grades					
(mm)	(in)	A	B	C	D	E	F
50	2	100	100				
25	1		75-95	100	100	100	100
9.5	3/8	30-65	40-75	50-85	60-100		
4.47	No. 4	25-55	30-60	35-65	50-85	55-100	70-100
2.00	No. 10	15-40	20-45	25-50	40-70	40-100	55-100
0.425	No. 40	8-20	15-30	15-30	25-45	20-50	30-70
0.075	No. 200	2-8	5-20	5-15	5-20	6-20	8-25

B. Materials meeting other gradations than that noted will be acceptable whenever the gradations are within a tolerance of three to five percent, plus or minus, of the single gradation established by the job-mix formula, or as recommended by the geotechnical engineer and approved by the Resident Engineer.

C. Subbase material shall produce a compacted, dense-graded course, meeting the density requirement specified herein.

2.4 FORMS

A. Use metal or wood forms that are straight and suitable in cross-section, depth, and strength to resist springing during depositing and consolidating the concrete, for the work involved.

B. Do not use forms if they vary from a straight line more than 1/8 inch (3 mm) in any ten foot (3000 mm) long section, in either a horizontal or vertical direction.

C. Wood forms should be at least 2 inches (50 mm) thick (nominal). Wood forms shall also be free from warp, twist, loose knots, splits, or other defects. Use approved flexible or curved forms for forming radii.

2.5 CONCRETE CURING MATERIALS

A. Concrete curing materials shall conform to one of the following:

1. Burlap having a weight of seven ounces (233 grams) or more per yard (square meter) when dry.
2. Impervious Sheeting conforming to ASTM C171.

2.6 EXPANSION JOINT FILLERS

Material shall conform to ASTM D1751-04.

PART 3 - EXECUTION

3.1 SUBGRADE PENETRATION

A. Prepare, construct, and finish the subgrade as specified in Section 31 00 00, EARTHWORK.

B. Maintain the subgrade in a smooth, compacted condition, in conformance with the required section and established grade until the succeeding operation has been accomplished.

3.2 SELECT SUBBASE (WHERE REQUIRED)

A. Mixing: Proportion the select subbase by weight or by volume in quantities so that the final approved job-mixed formula gradation, liquid limit, and plasticity index requirements will be met after subbase course has been placed and compacted. Add water in approved quantities, measured by weight or volume, in such a manner to produce a uniform blend.

B. Placing

1. Place the mixed material on the prepared subgrade in a uniform layer to the required contour and grades, and to a loose depth not to exceed 8 inches (200 mm), and that when compacted, will produce a layer of the designated thickness.
2. When the designated compacted thickness exceeds 6 inches (150 mm), place the material in layers of equal thickness. Remove unsatisfactory areas and replace with satisfactory mixture, or mix the material in the area.
3. In no case will the addition of thin layers of material be added to the top layer in order to meet grade.
4. If the elevation of the top layer is 1/2 inch (13 mm) or more below the grade, excavate the top layer and replace with new material to a depth of at least 3 inches (75 mm) in compacted thickness.

C. Compaction

1. Perform compaction with approved hand or mechanical equipment well suited to the material being compacted.
2. Moisten or aerate the material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.
3. Compact each layer to at least 95 percent or 100 percent of maximum density as specified in Section 31 00 00, EARTHWORK.

D. Smoothness Test and Thickness Control: Test the completed subbase for grade and cross section with a straight edge.

1. The surface of each layer shall not show any deviations in excess of 3/8 inch (10 mm).
2. The completed thickness shall be within 1/2 inch (13 mm) of the thickness as shown on the Drawings.

E. Protection

1. Maintain the finished subbase in a smooth and compacted condition until the concrete has been placed.
2. When Contractor's subsequent operations or adverse weather disturbs the approved compacted subbase, excavate, and reconstruct it with new material meeting the requirements herein specified, at no additional cost to the Government.

3.3 SETTING FORMS

A. Base Support

1. Compact the base material under the forms true to grade so that, when set, they will be uniformly supported for their entire length at the grade as shown.
2. Correct imperfections or variations in the base material grade by cutting or filling and compacting.

B. Form Setting

1. Set forms sufficiently in advance of the placing of the concrete to permit the performance and approval of all operations required with and adjacent to the form lines.
2. Set forms to true line and grade and use stakes, clamps, spreaders, and braces to hold them rigidly in place so that the forms and joints are free from play or movement in any direction.
3. Forms shall conform to line and grade with an allowable tolerance of 1/8 inch (3 mm) when checked with a straightedge and shall not deviate from true line by more than 1/4 inch (6 mm) at any point.
4. Do not remove forms until removal will not result in damaged concrete or at such time to facilitate finishing.
5. Clean and oil forms each time they are used.
6. Make necessary corrections to forms immediately before placing concrete.
7. When any form has been disturbed or any subgrade or subbase has become unstable, reset and recheck the form before placing concrete.

C. The Contractor's Registered Professional Land Surveyor shall establish the control, alignment and the grade elevations of the forms or concrete slip-forming machine operations. Staking notes shall be submitted for approval to the Resident Engineer prior to placement of concrete. If discrepancies exist between the field conditions and the Drawings, Contractor shall notify Resident Engineer immediately. No placement of concrete shall occur if a discrepancy greater than 1 inch (25 mm) is discovered.

3.4 EQUIPMENT

A. The Resident Engineer shall approve equipment and tools necessary for handling materials and performing all parts of the work prior to commencement of work.

B. Maintain equipment and tools in satisfactory working condition at all times.

3.5 PLACING REINFORCEMENT

A. Reinforcement shall be free from dirt, oil, rust, scale or other substances that prevent the bonding of the concrete to the reinforcement. All reinforcement shall be supported for proper placement within the concrete section.

B. Before the concrete is placed, the Resident Engineer shall approve the reinforcement placement, which shall be accurately and securely fastened in place with suitable supports and ties. The type, amount, and position of the reinforcement shall be as shown on the Drawings.

3.6 PLACING CONCRETE - GENERAL

A. Obtain approval of the Resident Engineer before placing concrete.

B. Remove debris and other foreign material from between the forms before placing concrete.

C. Before the concrete is placed, uniformly moisten the subgrade, base, or subbase appropriately, avoiding puddles of water.

D. Convey concrete from mixer to final place of deposit by a method which will prevent segregation or loss of ingredients. Deposit concrete so that it requires as little handling as possible.

E. While being placed, spade or vibrate and compact the concrete with suitable tools to prevent the formation of voids or honeycomb pockets. Vibrate concrete well against forms and along joints. Over-vibration or manipulation causing segregation will not be permitted. Place concrete continuously between joints without bulkheads.

F. Install a construction joint whenever the placing of concrete is suspended for more than 30 minutes and at the end of each day's work.

G. Workmen or construction equipment coated with foreign material shall not be permitted to walk or operate in the concrete during placement and finishing operations.

H. Cracked or Chipped Concrete Surfaces and Bird Baths. Cracked or chipped concrete and bird baths will not be allowed. Concrete with cracks or chips and bird baths will be removed and replaced to the nearest joints, and as approved by the Resident Engineer, by the Contractor with no additional cost to the Government.

3.7 PLACING CONCRETE FOR CURB AND GUTTER, PEDESTRIAN PAVEMENT, AND EQUIPMENT PADS

A. Place concrete in the forms in one layer of such thickness that, when compacted and finished, it will conform to the cross section as shown.

B. Deposit concrete as near to joints as possible without disturbing them but do not dump onto a joint assembly.

C. After the concrete has been placed in the forms, use a strike-off guided by the side forms to bring the surface to the proper section to be compacted.

D. Consolidate the concrete thoroughly by tamping and spading, or with approved mechanical finishing equipment.

E. Finish the surface to grade with a wood or metal float.

F. All Concrete pads and pavements shall be constructed with sufficient slope to drain properly.

3.8 PLACING CONCRETE FOR VEHICULAR PAVEMENT

A. Deposit concrete into the forms as close as possible to its final position.

B. Place concrete rapidly and continuously between construction joints.

C. Strike off concrete and thoroughly consolidate by a finishing machine, vibrating screed, or by hand-finishing.

D. Finish the surface to the elevation and crown as shown.

E. Deposit concrete as near the joints as possible without disturbing them but do not dump onto a joint assembly. Do not place adjacent lanes without approval by the Resident Engineer.

3.9 CONCRETE FINISHING - GENERAL

A. The sequence of operations, unless otherwise indicated, shall be as follows:
   1. Consolidating, floating, straight-edging, troweling, texturing, and edging of joints.
   2. Maintain finishing equipment and tools in a clean and approved condition.

3.10 CONCRETE FINISHING CURB AND GUTTER

A. Round the edges of the gutter and top of the curb with an edging tool to a radius of 1/4 inch (6 mm) or as otherwise detailed.

B. Float the surfaces and finish with a smooth wood or metal float until true to grade and section and uniform in textures.

C. Finish the surfaces, while still wet, with a bristle type brush with longitudinal strokes.

D. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the surface, while still wet, in the same manner as the gutter and curb top.

E. Except at grade changes or curves, finished surfaces shall not vary more than 1/8 inch (3 mm) for gutter and 1/4 (6 mm) for top and face of curb, when tested with a 10 foot (3000 mm) straightedge.

F. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.

G. Correct any depressions which will not drain. See Article 3.6, Paragraph H, above.

H. Visible surfaces and edges of finished curb, gutter, and/or combination curb and gutter shall be free of blemishes, form marks, and tool marks, and shall be uniform in color, shape, and appearance.

3.11 CONCRETE FINISHING PEDESTRIAN PAVEMENT

A. Walks and Wheelchair Curb Ramps:
   1. Finish the surfaces to grade and cross section with a metal float, troweled smooth and finished with a broom moistened with clear water.
   2. Brooming shall be transverse to the line of traffic.
   3. Finish all slab edges, including those at formed joints, carefully with an edger having a radius as shown on the Drawings.
   4. Unless otherwise indicated, edge the transverse joints before brooming. The brooming shall eliminate the flat surface left by the surface face of the edger. Execute the brooming so that

the corrugation, thus produced, will be uniform in appearance and not more than 1/16 inch (2 mm) in depth.

5. The completed surface shall be uniform in color and free of surface blemishes, form marks, and tool marks. The finished surface of the pavement shall not vary more than 3/16 inch (5 mm) when tested with a 10 foot (3000 mm) straightedge.
6. The thickness of the pavement shall not vary more than 1/4 inch (6 mm).
7. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints at no additional cost to the Government.

B. Steps: The method of finishing the steps and the sidewalls is similar to above except as herein noted.

1. Remove the riser forms one at a time, starting with the top riser.
2. After removing the riser form, rub the face of the riser with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Use an outside edger to round the corner of the tread; use an inside edger to finish the corner at the bottom of the riser.
3. Give the risers and sidewall a final brush finish. The treads shall have a final finish with a stiff brush to provide a non-slip surface.
4. The texture of the completed steps shall present a neat and uniform appearance and shall not deviate from a straightedge test more than 3/16 inch (5 mm).

3.12 CONCRETE FINISHING FOR VEHICULAR PAVEMENT

A. Accomplish longitudinal floating with a longitudinal float not less than 10 feet (3000 mm) long and 6 inches (150 mm) wide, properly stiffened to prevent flexing and warping. Operate the float from foot bridges in a sawing motion parallel to the direction in which the pavement is being laid from one side of the pavement to the other, and advancing not more than half the length of the float.

B. After the longitudinal floating is completed, but while the concrete is still plastic, eliminate minor irregularities in the pavement surfaces by means of metal floats, 5 feet (1500 mm) in length, and straightedges, 10 feet (3000 mm) in length. Make the final finish with the straightedges, which shall be used to float the entire pavement surface.

C. Test the surface for trueness with a 10 foot (3000 mm) straightedge held in successive positions parallel and at right angles to the direction in which the pavement is being laid and the entire area covered as necessary to detect variations. Advance the straightedge along the pavement in successive stages of not more than one half the length of the straightedge. Correct all irregularities and refinish the surface.

D. The finished surface of the pavement shall not vary more than 1/4 inch (6 mm) in both longitudinal and transverse directions when tested with a 10 foot (3000 mm) straightedge.

E. The thickness of the pavement shall not vary more than 1/4 inch (6 mm).

F. When most of the water glaze or sheen has disappeared and before the concrete becomes nonplastic, give the surface of the pavement a broomed finish with an approved fiber broom not

less than 18 inches (450 mm) wide. Pull the broom gently over the surface of the pavement from edge to edge. Brooming shall be transverse to the line of traffic and so executed that the corrugations thus produced will be uniform in character and width, and not more than 1/8 inch (3 mm) in depth. Carefully finish the edge of the pavement along forms and at the joints with an edging tool. The brooming shall eliminate the flat surface left by the surface face of the edger.

G. The finish surfaces of new and existing abutting pavements shall be flush and in alignment at their juncture.

3.13 CONCRETE FINISHING EQUIPMENT PADS

A. After the surface has been struck off and screeded to the proper elevation, provide a smooth dense float finish, free from depressions or irregularities.

B. Carefully finish all slab edges with an edger having a radius as shown in the Drawings.

C. After removing the forms, rub the faces of the pad with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The finish surface of the pad shall not vary more than 1/8 inch (3 mm) when tested with a 10 foot (3000 mm) straightedge.

D. Correct irregularities exceeding the above. See Article 3.6, Paragraph H, above.

3.14 JOINTS - GENERAL

A. Place joints, where shown on the Shop Drawings and Drawings, conforming to the details as shown, and perpendicular to the finished grade of the concrete surface.

B. Joints shall be straight and continuous from edge to edge of the pavement.

3.15 CONTRACTION JOINTS

A. Cut joints to depth as shown with a grooving tool or jointer of a radius as shown or by sawing with a blade producing the required width and depth.

B. Construct joints in curbs and gutters by inserting 1/8 inch (3 mm) steel plates conforming to the cross sections of the curb and gutter.

C. Plates shall remain in place until concrete has set sufficiently to hold its shape and shall then be removed.

D. Finish edges of all joints with an edging tool having the radius as shown.

E. Score pedestrian pavement with a standard grooving tool or jointer.

3.16 EXPANSION JOINTS

A. Use a preformed expansion joint filler material of the thickness as shown to form expansion joints.

B. Material shall extend the full depth of concrete, cut and shaped to the cross section as shown, except that top edges of joint filler shall be below the finished concrete surface where shown to allow for sealing.

C. Anchor with approved devices to prevent displacing during placing and finishing operations.

D. Round the edges of joints with an edging tool.

E. Form expansion joints as follows:
   1. Without dowels, about structures and features that project through, into, or against any site work concrete construction.
   2. Using joint filler of the type, thickness, and width as shown.
   3. Installed in such a manner as to form a complete, uniform separation between the structure and the site work concrete item.

3.17 CONSTRUCTION JOINTS

A. Locate // longitudinal // and transverse // construction joints between slabs of vehicular pavement as shown on the Shop Drawing jointing plan and Drawings.

B. Place transverse construction joints of the type shown, where indicated and whenever the placing of concrete is suspended for more than 30 minutes.

C. Use a butt-type joint with dowels in // curb and gutter // if the joint occurs at the location of a planned joint.

D. Use keyed joints with tiebars if the joint occurs in the middle third of the normal // curb and // gutter joint interval.

3.18 FORM REMOVAL

A. Forms shall remain in place at least 12 hours after the concrete has been placed. Remove forms without injuring the concrete.

B. Do not use bars or heavy tools against the concrete in removing the forms. Promptly repair any concrete found defective after form removal.

3.19 CURING OF CONCRETE

A. Cure concrete by one of the following methods appropriate to the weather conditions and local construction practices, against loss of moisture, and rapid temperature changes for at least seven days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to install before actual concrete placement begins. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period. If any selected method of curing does not afford the proper curing and protection against concrete cracking, remove and replace the damaged pavement and employ another method of curing as directed by the Resident Engineer.

B. Burlap Mat: Provide a minimum of two layers kept saturated with water for the curing period. Mats shall overlap each other at least 150 mm (6 inches).

C. Impervious Sheeting: Use waterproof paper, polyethylene-coated burlap, or polyethylene sheeting. Polyethylene shall be at least 4 mils (0.1 mm) in thickness. Wet the entire exposed concrete surface with a fine spray of water and then cover with the sheeting material. Sheets shall overlap each other at least 12 inches (300 mm). Securely anchor sheeting.

D. Liquid Membrane Curing:
   1. Apply pigmented membrane-forming curing compound in two coats at right angles to each other at a rate of 200 square feet per gallon (5 m2/L) for both coats.
   2. Do not allow the concrete to dry before the application of the membrane.
   3. Cure joints designated to be sealed by inserting moistened paper or fiber rope or covering with waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound entering the joint.
   4. Immediately re-spray any area covered with curing compound and damaged during the curing period.

3.20 CLEANING

A. After completion of the curing period:
   1. Remove the curing material (other than liquid membrane).
   2. Sweep the concrete clean.
   3. After removal of all foreign matter from the joints, seal joints as specified.
   4. Clean the entire concrete of all debris and construction equipment as soon as curing and sealing of joints has been completed.

3.21 PROTECTION

A. The contractor shall protect the concrete against all damage prior to final acceptance by the Government. Remove concrete containing excessive cracking, fractures, spalling, or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the Resident Engineer, and at no additional cost to the Government. Exclude traffic from vehicular pavement until the concrete is at least seven days old, or for a longer period of time if so directed by the Resident Engineer.

3.22 FINAL CLEAN-UP

A. Remove all debris, rubbish and excess material from the Station.

END OF SECTION 320523

SECTION 32 12 16

ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Asphalt concrete paving including installation of base course, wood header boards and the application of weed killer, base course, prime coat, paint coat, and seal coat.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the following documents hereinafter referred to as the "Standard Specifications".

B. Standard Specifications for Public Works Construction, 2018 edition, including the 2012 Regional Supplement Amendments, herein referred to as "Standard Specifications".

1. State of California Department of Transportation Standard Specifications (Current Edition).

1.3 SUBMITTALS

A. Design Data: Submit mix designs for asphalt concrete prepared by a materials laboratory under the direct supervision of a California Registered Engineer, or a standard mix design proven in actual performance.

B. Certificates

1. Submit certificates of compliance from the supplier for bituminous materials for prime coat, paint binder, bituminous concrete, and seal coat.

2. Submit weighmaster's certificates or certified delivery tickets for each truck load of bituminous material delivered to the project site.

3. Upon completion of the weed control treatment, and as a condition for final acceptance, furnish a written certificate stating the brand name of the sterilant and the manufacturer, and that the sterilant used had at least the minimum required concentration, and that the rate and method of application complied in every respect with the conditions and standards contained herein.

C. Submittal quantities and procedures are specified in Section 014300.

1.4 QUALITY ASSURANCE

A. Bituminous Concrete Producers Qualifications: Use only materials furnished by a bulk asphalt concrete producer regularly engaged in production of hot mix, hot laid asphalt concrete.

B. Applicator Qualifications: N/A

C. Regulatory Requirements

1. The quantity of volatile organic compounds (VOC) used in weed killer, seal coat, primer and other materials shall not exceed the limits permitted under the current regulations of the Governing Air Quality Management District.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver asphalt concrete in canvas covered trucks if necessary to maintain the specified spreading temperature.

1.6 PROJECT CONDITIONS

A. Environmental Conditions

1. Apply bituminous primer, paint binder, and seal coat only when the ambient temperature is above 50 degrees F and when the temperature has not been below 35 degrees F for 12 hours immediately before application.

2. Do not apply bituminous materials when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.

3. Construct asphalt concrete surface course only when the ambient temperature is above 40 degrees F, when the underlining base is dry and when it is not raining.

B. Existing Conditions: Protect concrete walks, curbs and bases, and other improvements adjacent to the operations. Repair damage caused by employees or equipment. Cover building and other surfaces with paper or other protection, where required where required.

1.7 WARRANTY

A. General Warranty: The warranties specified in this Article shall not deprive the County of other rights the County may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty signed by the soil sterilant manufacturer that the sterilant will prohibit growth of weeds through the paving for a period of 2 years from the date of "Notice of Completion".

PART 2 – PRODUCTS

2.1 MATERIALS

A. Aggregate Base: Standard Specifications, Article 200 2.2 for crushed aggregate base.

B. Prime Coat: Standard Specifications, Article 203 2 for Classification SC 250 liquid asphalt.

C. Paint Binder: Standard Specifications, Article 203 3 for Classification SS-1h anionic asphalt emulsion.

D. Bituminous Concrete Surface Course: Standard Specifications, Article 203 6, for hot plant mixed aggregate and asphalt, produced by a commercial asphalt paving plant, except as modified herein.

1. Asphalt Cement: Standard Specifications, Article 203 1, for steam refined paving asphalt, AR8000 Viscosity Grade, mixed with the aggregate at a rate specified in Article 203 6.3.

2. Aggregate: Standard Specifications, Article 203 6.3 for Class B gradation.

E. Surface Sealer: AASHTO Designation SS 1h emulsion type.

F. Soil Sterilant: Chemical sterilant, borate chlorate sterilant containing not less than 25 percent sodium chlorate and 75 percent disodium octaborate mixed thoroughly with water at the rate of 1 to 2 pounds of sterilant per gallon of water.

G. Wood Header Boards: Grade marked foundation grade redwood. Provide sizes of header boards and stakes as indicated. Scabs shall be minimum 1" by 4" size.

2.2 MIXING

A. Bituminous Concrete: Separate aggregate and keep in separate bins. Proportion sizes by means of multiple beam or dial scales of sufficient capacity to weigh the entire batch. Add asphalt and mix each batch until homogeneous mixture of uniformly distributed and properly graded and coated aggregates of unchanging appearance is produced, heated to a temperature of not less than 280 degrees F nor more than 320 degrees F.

PART 3 – EXECUTION

3.1 PREPARATION

A. Subgrade Preparation: Scarify earth subgrade to a depth of not less than 6 inches, and compact to 95 percent of maximum density.

B. Moisten with water to approximate optimum moisture content, and while moist, roll until the surface is unyielding, with a power roller of such weight as to develop a pressure of not less than 200 pounds per linear inch of roller width.

C. Correct irregularities by dressing down or filling as may be required, to bring areas to true subgrade elevations.

D. Where filling is required, scarify the subgrade to bond the new material to the in place material; use additional material as required, subject to the approval of the Architect, and provided by the Contractor.

E. Remove excess material from the site to a legal disposal area.

3.2 APPLICATION

A. Finish elevations, extent of asphalt paving and locations of type of asphalt and class of base shall be as indicated and specified. Bring subgrade elevations sufficiently below the finish elevations of the paving so as to accommodate the thickness of paving and base.

B. Placing Aggregate Base Course: Place base course on the compacted subgrade and compact in accordance with Standard Specifications, Article 301 2 to provide a compacted thickness as indicated. Finished surface of the subbase at any point shall not vary more than 0.05 foot above or below the grade indicated.

C. Sterilant Application: Place herbicide below asphalt paving. Meet the applicable environmental control requirements. Apply as directed by the manufacturer's printed instructions just before application of the paving. Take special care to insure that herbicide is not applied to any areas which are to be planted.

D. Placing Asphalt Concrete Surfacing

1. Prime Coat: Before the surface course is laid, apply liquid asphalt primer to the base course surface in accordance with Standard Specifications, Article 302 5.3.

2. Paint Binder: Before the surface course is laid, paint all vertical surfaces of curbs, gutters, and drainage structures and all cold or existing pavement joints with a paint binder. Apply paint binder in accordance with Standard Specifications, Article 302 5.4.

3. Placing Bituminous Concrete Surface Course: Spread the mixture at a temperature of not less than 250 degrees F. Use canvas covered trucks if specified spreading temperature cannot be maintained. Do not place mixture during unsuitable weather. Place by use of a self-propelled asphalt paving machine, except on small areas where inaccessibility precludes their use. On these small areas spread by means of a spreader box, or by hand methods.

a. Spread mixture in a single layer to such a thickness that, after receiving the final compaction, the finish paving shall have a minimum thickness as indicated.

4. Rolling: At proper time after the mixture has been spread, roll with power rollers of the type(s) and weight(s) required to obtain smoothness and density requirements specified. Use hot iron tampers at areas that are inaccessible to the rollers. Treat surface of the rollers with water or oil to prevent the mixture from adhering to rollers, but not in a quantity that would adversely affect the surface of the paving.

5. Berms, curbs, and slow down strips shall be placed with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

6. Seal Coat: Do not apply sealer prior to building occupancy. Cut back the emulsified asphalt with not over 50 percent water to obtain a uniform, free flowing consistency. Apply by spraying machines to all areas of asphalt concrete paving, at uniform application of 0.05 to 0.10 gallon of sealer to each square yard of bituminous concrete. Sand shall not be used in the seal coat operation.

3.3 HEADER BOARD INSTALLATION

A. Install header boards at perimeter of pavement with stakes spaced not over 24 inches on center unless otherwise indicated. Do not install header boards where bituminous concrete paving abuts buildings, concrete walks or curbs, or other pavements.

3.4 FIELD QUALITY CONTROL

A. Before seal coating, flood the paved areas with water to check drainage and surface irregularities. Replace, or overlay high and low spots in an acceptable manner and water test the paving again after corrections have been made.

B. All paving shall drain properly before being accepted. There shall be no variation greater than 1/4 inch plus or minus from a 10 foot straight edge, except at grade changes.

C. Replace or repair deficient and damaged asphalt paving.

3.5 PROTECTION

A. Protect asphalt paving against vehicular traffic before and for 48 hours following seal coating.

END OF SECTION 321216

SECTION 321316 - DECORATIVE CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes colored concrete paving.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.
2. Section 320523 "Cement and Concrete for Exterior improvements" for cast-in-place concrete paving with other finishes, curbs and gutters, and stamped detectable warnings.
3. Section 321316 “Decorative Concrete Paving”

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to decorative concrete paving, including but not limited to, the following:

    a. Concrete mixture design.
    b. Quality control of concrete materials and decorative concrete paving construction practices.

2. Require representatives of each entity directly concerned with decorative concrete paving to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Decorative concrete paving Installer.

e. Manufacturer's representative of decorative concrete paving system.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color, pattern, or texture selection.

C. Samples for Verification: For each type of exposed color, pattern, or texture indicated.

D. Design Mixtures: For each decorative concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

B. Material Test Reports: For each of the following:

1. Aggregates.

C. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of decorative concrete paving to demonstrate typical joints; surface color, pattern, and texture; curing; and standard of workmanship.

2. Build mockups of decorative concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Landscape Landscape Architect and not less than 60 inches by 60 inches.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Landscape Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on decorative concrete paving mixtures.

1.9 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms**,** steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves of a radius of 100 feet or less. Do not use notched and bent forms.

B. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration indicated. Provide solid backing and form supports to ensure stability of textured form liners.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

B. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type I/II.
2. Fly Ash: ASTM C 618, Class C or F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M, type IS, portland blast-furnace slag cement.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4S uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A, colored.
2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D, colored.
3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

F. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

G. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING AND SEALING MATERIALS

A. Curing Paper: Nonstaining, waterproof paper, consisting of two layers of kraft paper cemented together and reinforced with fiber, and complying with ASTM C 171.

B. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

C. Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, manufactured for colored concrete.

1. For integrally colored concrete, curing compound shall be pigmented type approved by coloring admixture manufacturer.
2. For concrete indicated to be sealed, curing compound shall be compatible with sealer.

D. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type I, Class A, manufactured for use with colored concrete.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type I, Class A, manufactured for use with colored concrete.

F. Clear Acrylic Sealer: Manufacturer's standard, waterborne, nonyellowing and UV-resistant, membrane-forming, medium-gloss, acrylic copolymer emulsion solution, manufactured for colored concrete, containing not less than 15 percent solids by volume.

G. Slip-Resistance-Enhancing Additive: Manufacturer's standard finely graded aggregate or polymer additive, designed to be added to clear acrylic sealer to enhance slip resistance of sealed paving surface.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy-Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

1. Types I and II, nonload bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Polyethylene Film: ASTM D 4397, 1 mil thick, clear.

2.7 CONCRETE MIXTURES

A. Obtain each color, size, type, and variety of concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties.

B. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

C. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Pozzolan: 25 percent.
2. Slag Cement: 50 percent.
3. Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

D. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
1. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.
2. Air Content: 3-1/2 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.

E. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

F. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture, water-reducing and retarding admixture or water-reducing and accelerating admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

H. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength 28 Days): 3000 psi.
2. Maximum W/C Ratio at Point of Placement: 0.50.
3. Slump Limit: 4 inches plus or minus 1 inch.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F , reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below decorative concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

B. Protect adjacent construction from discoloration and spillage during application of color hardeners, release agents, stains, curing compounds, and sealers.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap to adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.

2. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 40 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent decorative concrete paving:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

    a. Tolerance: Ensure that sawed joints are within 3 inches in both directions from centers of dowels.

2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.

D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

3.8 INTEGRALLY COLORED CONCRETE FINISH

A. Integrally Colored Concrete Finish: After final floating, apply the following finish:
1. Topcast retardant as indicated on plans.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Compound: Apply immediately after final finishing. Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

1. Cure integrally colored concrete with a pigmented curing compound.
2. Cure concrete finished with pigmented mineral dry-shake hardener with a pigmented curing compound.

F. Curing and Sealing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

G. Curing Paper: Cure with unwrinkled curing paper in pieces large enough to cover the entire width and edges of slab. Do not lap sheets. Fold curing paper down over paving edges and secure with continuous banks of earth to prevent displacement or billowing due to wind. Immediately repair holes or tears in paper.

3.10 SEALER APPLICATION

A. Clear Acrylic Sealer: Apply uniformly in two coats in continuous operations according to manufacturer's written instructions. Allow first coat to dry before applying second coat, at 90 degrees to the direction of the first coat, using same application methods and rates.

1. Begin sealing dry surface no sooner than 14 days after concrete placement.
2. Allow stained concrete surfaces to dry before applying sealer.
3. Thoroughly mix slip-resistance-enhancing additive into sealer before applying sealer according to manufacturer's written instructions. Stir sealer occasionally during application to maintain even distribution of additive.

3.11 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/2 inch (13 mm).
4. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
5. Vertical Alignment of Dowels: 1/4 inch (6 mm).

6. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
7. Joint Spacing: 3 inches (75 mm).
8. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
9. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Landscape Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Landscape Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Landscape Architect.

G. Decorative concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.13 REPAIR AND PROTECTION

A. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Landscape Architect.

B. Detailing: Grind concrete "squeeze" left from tool placement. Color ground areas with slurry of color hardener mixed with water and bonding agent. Remove excess release agent with high-velocity blower.

C. Protect decorative concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain decorative concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.14 DECORATIVE CONCRETE PAVING SCHEDULE

A. Decorative Concrete Paving :

1. Locations: As indicated on plans.
2. Coloring Method: Integrally colored.

    a. Color: As indicated on plans

3. Field Patterning Method: Top Cast Retardant

    a. Texture/Etch depth: As indicated on plan.

4. Field Patterning Method: Hand Seeded Exposed Aggregate

    a. Texture/Etch depth: As indicated on plan.

END OF SECTION 32 13 16

SECTION 32 17 23.28 – LANDSCAPE SYNTHETIC TURF SYSTEM

PART I – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. The work under this section shall consist of furnishing all labor, materials, and equipment necessary to install, in place, all synthetic turf and other materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with these specifications, the manufacturer's instructions and in accordance with all details and shop drawings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Submit manufacturer's catalog cuts, material safety data sheets (MSDS), brochures, specifications, preparation and installation instructions and recommendations
   2. All supplied and installed materials and products will meet or exceed the minimum specifications designated in this section. Sufficient data must be submitted to indicate compliance with the Contract Documents
   3. Submit instructions for installation.

B. Test Results: The following test results, certified by a licensed independent testing laboratory, shall be submitted as outlined below:
   1. Mandatory and minimum specifications as shown in Part 2. Products not meeting the minimum specifications will be rejected.
   2. At completion of project – Dynamic Cushioning Test according to ASTM F1292 HIC Testing
   3. Title 22, Cam 17 – EPA Method 6020. Test reports required for synthetic turf fibers.

C. Shop Drawings: Show fabrication and installation details for synthetic turf including, but not limited to:
   1. Proposed locations of all seams in fabric surfacing. Show installation methods and construction.

D. The manufacturer/installer shall provide the following samples of the synthetic turf specified for this project:

1. An 8.5-inch x 11-inch minimum sample of the exact synthetic turf system that is specified for this project.
2. An 8.5-inch x 11-inch minimum sample of the exact shock pad proposed by the contractor for this project.

E. Provide proof that the turf manufacturer is a member, in good standing, of the Synthetic Turf Council.

F. Warranty:

1. The Contractor shall provide a warranty to the Owner that covers defects in materials and installation workmanship of the turf for a period of eight (8) years from the date of substantial completion. The turf manufacturer must verify that their representative has inspected the installation and that the work conforms to the manufacturer's requirements and any written directives. The manufacturer's warranty shall include general wear and damage caused from UV degradation. Other items that must be addressed include the following:
    a. Acceptable uses for the field
    b. Fading
    c. Color match within specifications
    d. Excessive fiber wear
    e. Wrinkling and panel movement
    f. Shock absorbency (HIC TESTING)
    g. Seam integrity
    h. Drainage (through the turf only)

2. Exclusions shall include the following:
    a. Vandalism
    b. Acts of God beyond the control of the Owner or the Manufacturer

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Shall provide third party certification confirming compliance with referenced standards.

B. Source Limitations: Obtain synthetic turf through one source from a single manufacturer.

E. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of synthetic turf mounds with padding to demonstrate typical installation, joints, texture, color, and standard of workmanship.
2. Build mockups in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than the smallest proposed mound shown on the plan.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit synthetic turf work to be performed according to Contractor or Manufacturer's written instructions and warranty requirements.

B. Field Measurements: Indicate measurements on shop drawings.

1.6 MAINTENANCE SERVICE

A. Turf Installation Contractor shall train maintenance staff and/or contracted maintenance staff in the use of the recommended maintenance equipment and provide maintenance guidelines to the facility maintenance staff.

PART TWO – PRODUCTS

2.1 ACCEPTABLE TURF MANUFACTURERS

A. Pre-Approved manufacturer:

1. SynLawn San Diego – SYNLawn 356 (Product Code: SL 356)
   9350 Trade Place, Suite B
   San Diego, CA. 92126
   c. (858)527-2695 p. (858)566-7422 f. (858)689-9542
   Contact - Jamie Wittert

2. Substitutions may be considered and must meet and/or be equivalent to all listed requirements, qualifications and specifications.

2.2 PRODUCT SPECIFICATIONS - TURF

A. The fabric shall possess the following minimum physical characteristics. Any products

not meeting the ASTM testing requirements and minimum physical characteristics will be rejected:

Product Specification:	**Physical Characteristic**	**Method of Determination**
Physical Property		
Yarn Type: Grass Zone™	Polyethylene	n/a
Yarn Type: Thatch Zone™	Texturized Polypropylene	n/a
Yarn Color: Grass Zone™	Field Green Olive	n/a
Yarn Color: Thatch Zone™	Turf Green	n/a
Pile Height: Grass Zone™	1 ¾”	ASTM D 5823
Pile Height: Thatch Zone™	1 ½” +/- 15%	ASTM D 5823
Pile Weight: Grass Zone™	54 oz./sy	ASTM D 5848
Pile Weight: Thatch Zone™	24 oz./sy	ASTM D 5848
Total Pile Weight:	78 oz./sy	ASTM D 5848
Yarn Denier: Grass Zone™	10,800/6 D	ASTM D 1557
Yarn Denier: Thatch Zone™	5040/12	ASTM D 1557
Primary Backing: Secondary	8.0 oz. Woven	ASTM D 5848
Backing: Secondary	16.0 oz. EnviroLoc™	ASTM D 5848
Cushion Weight: Total	n/a	ASTM D 5848
Fabric Weight:	102 oz./sy	ASTM D
Fabric Width:	15 feet	5848 n/a
Tuft Gauge:	1/2”	ASTM D 5793
Tuft Bind:	> 8 lb.	ASTM D 1335
Flammability: (Pill	Pass	ASTM D 2859
Test) Flammability:	n/a	ASTM E 648
(Critical Radiant Flux)	n/a	ASTM F 355
Shock Absorbing Properties:	>30 inches per hour	ASTM F 1551
Water Permeability:	Compliant	ASTM F 2765-09

2.3 PAD

A. System must be installed over a turf-manufacturer approved shock pad. Pad must meet all environmental and fall height requirements of surrounding structures and fall zones as indicated on the drawings for fall safety. Contractor to determine proper pad from adjacent structures as indicated on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with

requirements for visual installation tolerances. Proceed with installation only after satisfactory conditions have been corrected.

B. The contractor/installer is required to first install one mound, and one mound only, of Owner's selection for Owner's visual and aesthetic review and acceptance, prior to continuing to another mound. The review will determine if the contractor has sufficiently installed the turf to the Owner's acceptable aesthetic intentions of the project. The Owner at any time can have the turf removed and re-installed at the contractor's cost for any reason they so determine. The installer must have authorization in writing from Owner's representative to continue with installation of the next mounds prior to continuing their scope of work. Failure to do so will mean full removal of the pad and turf that was installed prior to the review and written acceptance.

C. Certification of prior work: The synthetic turf manufacturer and / or installer shall perform a visual inspection of the base onto which the pad and synthetic turf system is to be installed and to examine the finished surface for required compaction, and grade tolerances (through string line testing). After any discrepancies between the required materials, application and tolerance requirements noted have been corrected, the synthetic turf installer shall submit a written certification of VISUAL acceptance of the base for installation of the synthetic turf system. Any tests other than VISUAL tests (string line, water hose, etc.) shall be the responsibility of the General Contractor.

D. Installation of all materials shall be performed in full compliance with approved project shop drawings. Only factory trained technicians skilled in the installation of synthetic turf systems, working under the direct supervision of the manufacturer's supervisors, shall undertake the placement of the turf system. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer as competent in the installation of these materials, including proper seaming and proper installation of pad. The turf manufacturer shall certify the installation and warranty compliance.

3.2 PREPARATION

A. Inspect delivered surface fabric and components immediately prior to installation. Any damaged or defective items shall be rejected. Installed artificial system shall be inspected for, but not limited to, the following:
   1. Uniformity of product and color
   2. Surface bubbles
   3. Field Edge installation
   4. Pile height of each roll shall be measured. Any material(s) that does not meet minimum height and thickness specifications shall be rejected. Pile height shall be measured in its finished positions.

B. Environmental Conditions: Weather conditions are important for the successful installation of the systems. No work under this section will proceed when:

1. Ambient temperatures are below 45 degrees F.
2. Material temperatures are below 45 degrees F.
3. Surfaces are wet or damp
4. Rain is imminent or falling.
5. Conditions exist or are imminent, which will be unsuitable to installation requirements of the systems specified herein. Humidity levels will be inside the limits recommended by the adhesive manufacturer to obtain optimum bonding characteristics of the surfaces.

3.3 INSTALLATION OF THE SYNTHETIC TURF

A. The carpet rolls are to be installed directly over the properly installed shock pad. Extreme care should be taken to avoid disturbing the pad and the base stone both in regard to compaction and planarity. A 2-5 ton static roller shall be on site and available to repair and properly compact any disturbed areas of the base stone while installing the pad.

B. The full width rolls shall be laid out across the mounds. All work shall be such that the seams shall remain as required for the duration of the warranty period at a minimum. All seam widths are to be held to a minimum. Seams shall be flat, tight and permanent with no separation or fraying.

C. The perimeter of the mounds shall be firmly secured to the edge anchors for the life of the warranty and in accordance to project details.

3.4 FINAL ACCEPTANCE

A. Prior to final acceptance, the Contractor shall submit to the Owner three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system.

B. The finished installation shall be visually acceptable to the Owner’s representative. The Owner at any time can reject the workmanship for any reason that effects the visual appeal of the turf installation.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing and inspecting of completed applications of synthetic turf system shall take place in successive stages, in areas of extent and using methods that are industry standard. Do not proceed with application of next stages until test results for previously completed applications show compliance.

C. Remove and replace items where test results indicate that they do not comply with specified requirements.

3.6 CLEANING

A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items. All usable remnants of new material shall become the property of the Owner. The Contractor shall keep the area clean throughout the project and clear of debris. Surfaces, recesses, enclosures, etc., shall be cleaned, as necessary, to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION 32 17 23.28

SECTION 328400 – PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Piping.
2. Manual valves.
3. Pressure-reducing valves.
4. Automatic control valves.
5. Transition fittings.
6. Dielectric fittings.
7. Miscellaneous piping specialties.
8. Sprinklers.
9. Quick couplers.
10. Drip irrigation specialties.
11. Controllers.
12. Boxes for automatic control valves.

1.3 DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. ET Controllers: EvapoTranspiration Controllers. Irrigation controllers which use some method of weather-based adjustment of irrigation. These adjusting methods include use of historical monthly averages of ET; broadcasting of ET measurements; or use of on-site sensors to track ET.

D. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

E. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

1. Irrigation Main Piping: 200 psig.
2. Circuit Piping: 150 psig.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.

B. Zoning Chart: Show each irrigation zone and its control valve.

C. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sprinklers, controllers and automatic control valves to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.10 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without [Owner's] written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes. All equipment for use with recycled water irrigation shall conform to equipment schedule and feature purple coloring for recycled water as indicated in plans.

B. Galvanized-Steel Pipe: ASTM A53/A53M, Standard Weight, Type E, Grade B.

1. Galvanized-Steel Pipe Nipples: ASTM A733, made of ASTM A53/A53M or ASTM A106/A106M, Standard Weight, seamless-steel pipe with threaded ends.
2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
3. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
4. Cast-Iron Flanges: ASME B16.1, Class 125.

C. Ductile-Iron Pipe with Mechanical Joints: AWWA C151, with mechanical-joint bell and spigot ends.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

D. Ductile-Iron Pipe with Push-on Joint: AWWA C151, with push-on-joint bell and spigot ends.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Gaskets: AWWA C111, rubber.

E. Soft Copper Tube: ASTM B88, Type L, water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

F. Hard Copper Tube: ASTM B88, Type M water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

G. PE Pipe with Controlled ID: ASTM F771, PE 3408 compound; SIDR 11.5 and SIDR 15.

1. Insert Fittings for PE Pipe: ASTM D2609, nylon or propylene plastic with barbed ends. Include bands or other fasteners.

H. PE Pipe with Controlled OD: ASTM F771, PE 3408 compound, SDR 11.

1. PE Butt, Heat-Fusion Fittings: ASTM D3261.
2. PE Socket-Type Fittings: ASTM D2683.

I. PE Pressure Pipe: AWWA C906, with DR of 7.3, 9, or 9.3 and PE compound number required to give pressure rating not less than 160 psig.

1. PE Butt, Heat-Fusion Fittings: ASTM D3261.
2. PE Socket-Type Fittings: ASTM D2683.

J. PVC Pipe: ASTM D1785, PVC 1120 compound, Schedule 40.

1. PVC Socket Fittings: ASTM D2466, Schedule 40.
2. PVC Threaded Fittings: ASTM D2464, Schedule 80.
3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

K. PVC Pipe, Pressure Rated: ASTM D2241, PVC 1120 compound, SDR 26.

1. PVC Socket Fittings: ASTM D2467, Schedule 80.
2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.2 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

D. Solder Filler Metals: ASTM B32, lead-free alloys. Include water-flushable flux according to ASTM B813.

E. Solvent Cements for Joining PVC Piping: ASTM D2564. Include primer according to ASTM F656.

F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 AUTOMATIC CONTROL VALVES

A. Bronze, Automatic Control Valves:
1. Description: Cast-bronze body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

B. Plastic, Automatic Control Valves:
1. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.4 AUTOMATIC DRAIN VALVES

A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig.

2.5 TRANSITION FITTINGS

A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

B. Transition Couplings:

1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.

C. Plastic-to-Metal Transition Fittings:
1. Description: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-socket or threaded end.

D. Plastic-to-Metal Transition Unions:
   1. Description: MSS SP-107, PVC four-part union. Include one brass or stainless-steel threaded end, one solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.

2.6 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:
   1. Description: Factory-fabricated union, NPS 2 and smaller.
      a. Pressure Rating: 150 psig minimum.
      b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.

C. Dielectric Flanges:
   1. Description: Factory-fabricated, bolted, companion-flange assembly, NPS 2-1/2 to NPS 4 and larger.
      a. Pressure Rating: 150 psig minimum.
      b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:
   1. Description: Nonconducting materials for field assembly of companion flanges, NPS 2-1/2 and larger.
      a. Pressure Rating: 150 psig minimum.
      b. Gasket: Neoprene or phenolic.
      c. Bolt Sleeves: Phenolic or polyethylene.
      d. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:
   1. Description: Galvanized-steel coupling.
      a. Pressure Rating: 300 psig at 225 deg F.
      b. End Connections: Female threaded.
      c. Lining: Inert and noncorrosive, thermoplastic lining.

F. Dielectric Nipples:
   1. Description: Electroplated steel nipple complying with ASTM F1545.
      a. Pressure Rating: 300 psig at 225 deg F.
      b. End Connections: Male threaded or grooved.
      c. Lining: Inert and noncorrosive, propylene.

2.7 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASSE 1010 or PDI WH 201, with bellows or piston-type pressurized cushioning chamber and in sizes complying with PDI WH 201, Sizes A to F.

B. Pressure Gages: ASME B40.1. Include 4-1/2-inch diameter dial, dial range of two times system operating pressure, and bottom outlet.

2.8 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

B. Metal, Exposed, Impact-Drive Rotary Sprinklers:
   1. Description:
      a. Construction: Brass and other corrosion-resistant metals.
      b. Mounting: Aboveground, exposed on riser.
   2. Capacities and Characteristics:
      a. As indicated on the plans.

C. Plastic, Exposed, Impact-Drive Rotary Sprinklers:
   1. Description:
      a. Construction: ABS and corrosion-resistant metals.
      b. Mounting: Aboveground, exposed on riser.
   2. Capacities and Characteristics:
      a. As indicated on the plans

D. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:
   1. Description:
      a. Body Material: ABS.
      b. Nozzle: ABS.
      c. Retraction Spring: Stainless steel.
      d. Internal Parts: Corrosion resistant.
   2. Capacities and Characteristics:
      a. As indicated on the plans.

E. Metal, Pop-up, Impact-Drive Rotary Sprinklers:
   1. Description:

a. Case: Brass.
b. Body Material: Brass.
c. Pop-up Height: 4 inches aboveground to nozzle.
d. Sprinkler Construction: Brass and other corrosion-resistant metals.

2. Capacities and Characteristics:

a. As indicated on the plans.

F. Plastic, Pop-up, Impact-Drive Rotary Sprinklers:

1. Description:

a. Case: ABS.
b. Pop-up Height: 4 inches aboveground to nozzle.
c. Sprinkler Construction: ABS and other corrosion-resistant metals.

2. Capacities and Characteristics:

a. As indicated on the plans.

G. Metal, Surface Spray Sprinklers:
1. Description:

a. Body Material and Flange: Brass.
b. Nozzle: Brass.
c. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans.

H. Plastic, Surface Spray Sprinklers:
1. Description:

a. Body Material and Flange: ABS.
b. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans.

I. Metal, Surface, Pop-up Spray Sprinklers:
1. Description:

a. Body Material and Flange: Brass.
b. Nozzle: Brass.
c. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans.

J. Plastic, Surface, Pop-up Spray Sprinklers:
1. Description:

a. Body Material and Flange: ABS.
b. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans..

K. Plastic, Pop-up Spray Sprinklers:
1. Description:

a. Body Material: ABS.
b. Nozzle: ABS.
c. Retraction Spring: Stainless steel.
d. Internal Parts: Corrosion resistant.
e. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans..

L. Metal Shrub Sprinklers:
1. Description:

a. Body Material: Brass.
b. Nozzle: Brass.
c. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans..

M. Plastic Shrub Sprinklers:
1. Description:

a. Body Material: ABS or other plastic.
b. Pattern: Fixed, with flow adjustment.

2. Capacities and Characteristics:

a. As indicated on the plans..

2.9 QUICK COUPLERS

A. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1. Locking-Top Option: Vandal-resistant locking feature. Include one matching key(s).

2.10 DRIP IRRIGATION SPECIALTIES

A. Freestanding Emitters: Device to deliver water at approximately 20 psig.

1. Body Material: PE or vinyl, with flow control.
2. Riser to Emitter: PE or PVC flexible tubing.
3. Capacities and Characteristics:

    a. As indicated on the plans.

B. Manifold Emitter Systems: Manifold with tubing and emitters.

1. Manifold: With multiple outlets to deliver water to emitters.

    a. Body Material: Plastic.
    b. Outlet Caps: Plastic, for outlets without installed tubing.
    c. Operation: Automatic pressure compensating.

2. Tubing: PE or PVC; 1/8-inch minimum ID.
3. Emitter: Device to deliver water at approximately 20 psig.

    a. Body Material: PE or vinyl, with flow control.

4. Capacities and Characteristics:

    a. As indicated on the plans.

C. Multiple-Outlet Emitter Systems: Emitter with tubing and button-type outlets.

1. Emitter: With multiple outlets to deliver water to remote outlets.

    a. Body Material: Plastic, with flow control.
    b. Outlet Caps: Plastic, for outlets without installed tubing.
    c. Operation: Automatic pressure compensating.
    d. Emitters: Devices to deliver water at approximately 20 psig.

2. Tubing: PE or PVC; 1/8-inch minimum ID.
3. Capacities and Characteristics:

    a. As indicated on the plans..

D. Drip Tubes with Direct-Attached Emitters:

1. Tubing: Flexible PE or PVC with plugged end.
2. Emitters: Devices to deliver water at approximately 20 psig.

    a. Body Material: PE or vinyl, with flow control.
    b. Mounting: Inserted into tubing at set intervals.

3. Capacities and Characteristics:

    a. As indicated on the plans.

E. Drip Tubes with Remote Discharge:

1. Tubing: Flexible PE or PVC with plugged end.
2. Emitters: Devices to deliver water at approximately 20 psig.

    a. Body Material: PE or vinyl, with flow control.
    b. Mounting: Inserted into tubing at set intervals.

3. Capacities and Characteristics:

    a. As indicated on the plans..

F. Off-Ground Supports: Plastic stakes.

G. Application Pressure Regulators: Brass or plastic housing, NPS 3/4, with corrosion-resistant internal parts; capable of controlling outlet pressure to approximately 20 psig.

H. Filter Units: Brass or plastic housing, with corrosion-resistant internal parts; of size and capacity required for devices downstream from unit.

I. Air Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

J. Vacuum Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

2.11 CONTROLLERS

A. Description:

1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.

    a. Body Material: Stainless-steel sheet metal.
    b. Mounting: Freestanding type for concrete base.

3. Control Transformer: 24-V secondary, with primary fuse.
4. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.

    a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
    b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
    c. Surge Protection: Metal-oxide-varistor type on each station and primary power.

5. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.
6. Smart Controllers: Use ET, tested in accordance with IA SWAT Climatological Based Controllers 8th Draft Testing Protocol and compliant with ASHRAE Standard 189.1.
7. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.

    a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
    b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
    c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

8. Concrete Base: Reinforced precast concrete not less than 36 by 24 by 4 inches thick, and 6 inches greater in each direction than overall dimensions of controller. Include opening for wiring.

2.12 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:
    1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

        a. Size: As required for valves and service.
        b. Shape: Rectangular.
        c. Sidewall Material: PE, ABS, or FRP.
        d. Cover Material: PE, ABS, or FRP.

            1) Lettering: "VALVE BOX IRRIGATION

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

B. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.

C. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from 3/4 to 3 inches, to 12 inches below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.

D. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 36 inches below finished grade, or not less than 18 inches below average local frost depth, whichever is deeper.
2. Circuit Piping: 12 inches.
3. Drain Piping: 12 inches.
4. Sleeves: 24 inches.

3.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

3.3 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.

B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.

C. Install piping free of sags and bends.

D. Install groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Install unions adjacent to valves and to final connections to other components with NPS 2 (DN 50) or smaller pipe connection.

G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 (DN 65) or larger pipe connection.

H. Install underground thermoplastic piping according to ASTM D2774 and ASTM F690.

I. Install expansion loops in control-valve boxes for plastic piping.

J. Lay piping on solid subbase, uniformly sloped without humps or depressions.

K. Install ductile-iron piping according to AWWA C600.

L. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

M. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.

N. Water Hammer Arresters: Install between connection to building main and circuit valves aboveground or in control-valve boxes.

O. Install piping in sleeves under parking lots, roadways, and sidewalks.

P. Install sleeves made of Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

Q. Install transition fittings for plastic-to-metal pipe connections according to the following:

1. Underground Piping:

a. NPS 1-1/2 and Smaller: Plastic-to-metal transition fittings.
b. NPS 2 and Larger: AWWA transition couplings.

2. Aboveground Piping:

a. NPS 2and Smaller: Plastic-to-metal transition fittings or unions.
b. NPS 2 and Larger: Use dielectric flange kits with one plastic flange.

R. Install dielectric fittings for dissimilar-metal pipe connections according to the following:

1. Underground Piping:

a. NPS 2 and Smaller: Dielectric coupling or dielectric nipple.
b. NPS 2-1/2 and Larger: Prohibited except in control-valve box.

2. Aboveground Piping:

a. NPS 2 and Smaller: Dielectric union.
b. NPS 2-1/2 to NPS 4: Dielectric flange.
c. NPS 5 and Larger: Dielectric flange kit.

3. Piping in Control-Valve Boxes:

a. NPS 2 and Smaller: Dielectric union.
b. NPS 2-1/2 to NPS 4: Dielectric flange.
c. NPS 5 and Larger: Dielectric flange kit.

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.

F. Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.

G. Copper-Tubing Soldered Joints: Apply ASTM B813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B32.

H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.

I. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.

1. Plain-End PE Pipe and Fittings: Use butt fusion.
2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.

J. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Pressure Piping: Join schedule number, ASTM D1785, PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
3. PVC Nonpressure Piping: Join according to ASTM D2855.

3.5 VALVE INSTALLATION

A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.

B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.

1. Install valves and PVC pipe with restrained, gasketed joints.

C. Aboveground Valves: Install as components of connected piping system.

D. Pressure-Reducing Valves: Install in boxes for automatic control valves or aboveground between shutoff valves. Install full-size valved bypass.

E. Throttling Valves: Install in underground piping in boxes for automatic control valves.

F. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.6 SPRINKLER INSTALLATION

A. Install sprinklers after hydrostatic test is completed.

B. Install sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.7 DRIP IRRIGATION SPECIALTY INSTALLATION

A. Install freestanding emitters on pipe riser to mounting height indicated.

B. Install manifold emitter systems with tubing to emitters. Plug unused manifold outlets. Install emitters on off-ground supports at height indicated.

C. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.

D. Install drip tubes with direct-attached emitters on ground.

E. Install drip tubes with remote-discharge on ground with outlets on off-ground supports at height indicated.

F. Install off-ground supports of length required for indicated mounted height of device.

G. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.

H. Install air relief valves and vacuum relief valves in piping, and in control-valve boxes.

3.8 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.9 CONNECTIONS

A. Comply with requirements for piping specified in Section 221113 "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.

C. Connect wiring between controllers and automatic control valves.

3.10 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.11 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.12 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.13 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

3.14 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.15 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

END OF SECTION 328400

SECTION 329113 – SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes planting soils and layered soil assemblies specified by composition of the mixes.

B. Related Requirements:
1. Section 311000 "Site Clearing-Grubbing" for topsoil stripping and stockpiling.
2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
3. Section 329300 "Plants" for placing planting soil for plantings.

1.3 ALLOWANCES

A. Preconstruction and field quality-control testing are part of testing and inspecting allowance.

1.4 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

F. Imported Soil: Soil that is transported to Project site for use.

G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.

H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

M. SSSA: Soil Science Society of America.

N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

Q. USCC: U.S. Composting Council.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:

    a. Manufacturer's qualified testing agency's certified analysis of standard products.
    b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
    c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.7 INFORMATIONAL SUBMITTALS

A. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

B. Field quality-control reports.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil and imported soil.

1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.10 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.

1. Number and Location of Samples: Minimum of eight representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."

3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.11 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

   a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
   b. Hydrometer Method: Report percentages of sand, silt, and clay.

2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.

5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inchdepth of soil.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inchdepth of soil.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

B. Planting-Soil Type 1: Existing, on-site surface soil, with the duff layer, if any, retained; and stockpiled on-site; modified to produce viable planting soil.
   1. Amend soil composition per soil analysis as indicated below:
      a. Percentage of Organic Matter: Minimum 3 percent by volume.
      b. Soil Reaction: pH of 6 to 7.5.
      c. CEC of Total Soil: Minimum 4 meq/100 mL at pH of 7.0.
      d. Requirement in "CEC of Clay Fraction" Subparagraph below is used to limit the amount of expansive clays.
      e. Soluble-Salt Content: 5 max dS/m measured by electrical conductivity.
      f. RCRA Metals: Below maximum limits established by the EPA.
      g. Phytotoxicity: Below phytotoxicity limits established by SSSA.

   2. For bid purposes blend existing, on-site surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil.
      a. Insert a maximum value in "Percentage of Organic Matter" Subparagraph below if required.
      b. 4 yds/1000 sf humic compost
      c. 50 lbs/sf gypsum
      d. 15 lbs/sf slow release fertilizer

C. Planting-Soil Type 2 at Interior Tree Wells: Imported, naturally formed soil from off-site sources and consisting of sandy loam soil according to USDA textures; and modified to produce viable planting soil.

   1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.
   2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7.5 and minimum of 3 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
   3. Unacceptable Properties: Clean soil of the following:

      a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
      b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.

c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.

4. Amended Soil Composition: Per soil analysis report.
   a. For bid purposes provide the following:
      1) 70% Sandy Loam Topsoil
      2) 20% Humic Compost
      3) 10% 3/8” minus Pumice

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone or mollusk shells.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C33/C33M.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Feedstock: Limited to leaves.
2. Reaction: pH of 6.5 to 8.
3. Soluble-Salt Concentration: Less than 4 dS/m.
4. Moisture Content: 35 to 55 percent by weight.
5. Organic-Matter Content: 30 to 40 percent of dry weight.
6. Particle Size: Minimum of 98 percent passing through a 2-inch sieve.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

2.4 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of [20] [33] [50] percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 12 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

C. Mixing: Spread unamended soil to total depth of 4 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.

a. Mix lime and sulfur with dry soil before mixing fertilizer.
b. Mix fertilizer with planting soil no more than seven days before planting.

2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 and tested in-place except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 12 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply approximately half the thickness of planting soil over prepared, loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

C. Application: Spread planting soil to total depth of 4 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of of 12 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.

1. Mix lime and sulfur with dry soil before mixing fertilizer.
2. Mix fertilizer with planting soil no more than seven days before planting.

D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

A. Application: Apply compost component of planting-soil mix to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D698. Space tests at no less than one for each 1000 sq. ft. of in-place soil or part thereof.

C. Soil will be considered defective if it does not pass tests.

D. Prepare test reports.

E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.8 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is over compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.9 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Sodding.

B. Related Requirements:

   1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" and drawing designations for planting soils.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of suppliers.

B. Product Certificates: For fertilizers, from manufacturer.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Supervision
1. Installer's Field Supervision: Require Installer to maintain a full-time supervisor on Project site when work is in progress.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March thru August.
2. Fall Planting: September thru February.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

A. Turfgrass Sod: Certified, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

B. Turfgrass Species: Bermudagrass (Cynodon dactylon).

2.2 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.

D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

G. Asphalt Emulsion: ASTM D977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.4 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel,

paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.

1. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 PREPARATION FOR GRASS-PAVING MATERIALS

A. Reduce subgrade elevation soil to allow for thickness of grass-paving system. Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade so that installed paving is within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions.

B. Install base course and sand course and sandy loam soil mix as recommended by paving-material manufacturer for site conditions and according to details indicated on Drawings. Compact according to paving-material manufacturer's written instructions.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.6 SODDING

A. Lay sod within 24 hours of harvesting unless a suitable preservation method is accepted by Architect prior to delivery time. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

D. TURF MAINTENANCE

E. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

F. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

G. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowing to maintain the following grass height:
1. Mow bermudagrass to a height of 1/2 to 1 inch.

H. Turf Postfertilization: Apply slow-release fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.8 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.10 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Sodded Turf: 90 days from date of Substantial Completion.

B. Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Meadow Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than maintenance period below.

1. Maintenance Period: 90 days from date of Substantial Completion.

END OF SECTION 329200

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Landscape edgings.
4. Tree grates.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
   Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

C. Finish Grade: Elevation of finished surface of planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Area: Areas to be planted.

G. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

H. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

I. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

J. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

K. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:
1. Organic Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Proprietary Root-Ball-Stabilization Device: One unit.
3. Slow-Release, Tree-Watering Device: One unit of each size required.
4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

5. Tree Grates, Frames, and Accessories: Manufacturer's standard size delivered to site for review, to verify design and color selected.
6. Root Barrier: Width of panel by 12 inches.

1.7 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

B. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

C. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

A. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.

B. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

C. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

F. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

G. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

H. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March thru August.
2. Fall Planting: September thru February.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization, edgings, and tree grates.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods: From date of Substantial Completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: Six months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 10-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.

2. Size Range: 3 inches maximum, 1/2 inch.
3. Color: Natural.

B. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of the following type, size range, and color:

1. Type: Crushed Stone
2. Size Range: 1" – 4"
3. Color: Rusty Gold to Brown

4. Type: Gravel
5. Size Range: 3/8"
6. Color: Golden Orange and Apricot

2.4 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Guys and Tie Wires: ASTM A641/A641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
5. Guy Cables: Five-strand, 3/16-inch diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated; stakes pointed at one end.
2. Wood Screws: ASME B18.6.1.

3. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball and that do not encircle the trunk; sized according to manufacturer's written recommendations unless otherwise indicated.

2.6 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
   1. Edging Size: Per manufacturers recommendations.
   2. Stakes: Tapered steel, a minimum of 12 inches long.
   3. Accessories: Standard tapered ends, corners, and splicers.
   4. Finish: Zinc coated.
      a. Paint Color: Black.

2.7 TREE GRATES

A. Tree Grates: Manufacturer's standard tree grates and frames.
   1. Grates: ASTM A48/A48M, Class 35 or better, gray-iron castings.
   2. Frames: ASTM A36/A36M steel-angle, hot-dip galvanized, of shape, pattern, and size indicated.

B. Shape and Size: As indicated on Drawings.

C. Finish: As fabricated.

2.8 MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.

B. Root Barrier: Black, molded, modular panels [18 inches (457 mm)] [24 inches (610 mm)] <Insert dimension> high (deep), 85 mils (2.2 mm) thick, and with vertical root deflecting ribs protruding 3/4 inch (19 mm) out from panel surface; manufactured with minimum 50 percent recycled polyethylene plastic with UV inhibitors.

C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

D. Burlap: Non-synthetic, biodegradable.

E. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D448 for Size No. 8.

F. Planter Filter Fabric: [Woven] [Nonwoven] geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

G. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

D. Application of Mycorrhizal Fungi: At time directed by Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
2. Excavate approximately three times as wide as ball diameter for container-grown stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected after working hours.
9. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to

where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

    a. Quantity: 1 Gallon (2) 10 gram tablets, 5 gallon (3) 10 gram tablets, 15 gallon/24" box (6) 10 gram tablets.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension indicated on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.

3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.

1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

    a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
    b. For trees more than 6 inches, anchor guys to wood deadmen buried at least 36 inches (900 mm) below grade. Provide turnbuckle for each guy wire and tighten securely.
    c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    d. Support trees with guy cable, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    e. Attach flags to each guy wire, 30 inches above finish grade.
    f. Paint turnbuckles with luminescent white paint.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

C. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.

1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.

    a. Install stakes of length required to penetrate at least to the dimension indicated on Drawings below bottom of backfilled excavation. Saw stakes off at horizontal stake.
    b. Install screws through horizontal hold-down and penetrating at least 1 inch into stakes. Predrill holes if necessary to prevent splitting wood.
    c. Install second set of stakes on other side of root trunk for larger trees.

2. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

D. Palm Bracing: Install bracing system at three or more places equally spaced around perimeter of trunk to secure each palm until established unless otherwise indicated.

1. Site-Fabricated Palm-Bracing Method:

    a. Place battens over padding and secure battens in place around trunk perimeter with at least two straps, tightened to prevent displacement. Ensure that straps do not contact trunk.
    b. Place diagonal braces and cut to length. Secure upper ends of diagonal braces with galvanized nails into battens or into nail-attached blocks on battens. Do not drive nails, screws, or other securing devices into palm trunk; do not penetrate palm trunk in any fashion. Secure lower ends of diagonal braces with stakes driven into ground to prevent outward slippage of braces.

2. Proprietary Palm-Bracing Device: Install palm-bracing system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.8 ROOT-BARRIER INSTALLATION

A. Install root barrier where trees are planted within 60 inches of paving or other hardscape elements, such as walls, curbs, and walkways, unless otherwise indicated on Drawings.

B. Align root barrier vertically, and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.

C. Install root barrier continuously for a distance of 60 inches in each direction from the tree trunk, for a total distance of 10 feet per tree. If trees are spaced closer, use a single continuous piece of root barrier.

1. Position top of root barrier according to manufacturer's written recommendations.
2. Overlap root barrier a minimum of 12 inches at joints.
3. Do not distort or bend root barrier during construction activities.
4. Do not install root barrier surrounding the root ball of tree.

3.9 PLACING SOIL IN PLANTERS

A. Place a layer of drainage gravel at least 4 inches thick in bottom of planter. Cover bottom with filter fabric and wrap filter fabric 6 inches up on all sides. Duct tape along the entire top edge of the filter fabric, to secure the filter fabric against the sides during the soil-filling process.

B. Fill planter with planting soil. Place soil in lightly compacted layers to an elevation of 1-1/2 inches below top of planter, allowing natural settlement.

3.10 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.11 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 12-inch radius around trunks or stems. Do not place mulch within 6 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.

3.12 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

B. Mow-Strip Installation:

1. Excavate for mow strip as indicated on Drawings.
2. Compact subgrade uniformly beneath mow strip.
3. Apply nonselective, pre-emergent herbicide that inhibits growth of grass and weeds.
4. Install wood, steel, aluminum, or plastic edging, delineating the edge of mow strip.
5. Place indicated thickness of organic mulch, fully covering weed barrier.
6. Rake mulch to a uniform surface level with adjacent finish grades.

3.13 TREE GRATE INSTALLATION

A. Tree Grates: Install according to manufacturer's written instructions. Set grate segments flush with adjoining surfaces. Shim from supporting substrate with soil-resistant plastic. Maintain a 3-inch minimum growth radius around base of tree; break away portions of casting, if necessary, according to manufacturer's written instructions.

3.14 INSTALLING SLOW-RELEASE WATERING DEVICE

A. Provide one device for each tree.

B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.15 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.16 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.17 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree of 6 inches or smaller in caliper size.
2. Provide one new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
3. Species of Replacement Trees: Species selected by Architect.

3.18 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.19 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 90 days from date of Substantial Completion.

B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 90 days from date of Substantial Completion.

END OF SECTION 329300

SECTION 33 10 00

WATER UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work includes: Provide buried domestic and fire water piping including valves, adaptors, thrust blocks, fittings, and appurtenances; removal of existing water line and hydrant as shown on drawings; prepare for connections to existing water lines; and perform pressure tests, leakage tests and disinfection of new lines where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. This work will be done both on private property and in the right-of-way.

B. Related Work specified in other sections of these Specifications:

1. Excavating and Backfilling for Utilities
2. Disinfection of Potable Water Systems

1.2 REFERENCE STANDARDS

A. Standard Specifications for Public Works Construction, 2018 edition, including Standard Specifications for Water, Recycled Water and Sewer Facilities Amendments, herein referred to as "Standard Specifications".

B. Water Agency Standards (WAS) "Standard Drawings".

C. AWWA Standards

D. ASTM Standards

1.3 REQUIREMENTS OF REGULATORY AGENCIES

A. All work within a public right of way, alleys and public utility easements must comply with the approved City of San Diego Standard Drawings for Public Works Construction and the following Standard Specifications

1. Standard Specifications for Public Works Construction, 2018 edition, including Standard Specifications for Water, Recycled Water and Sewer Facilities Amendments, herein referred to as "Standard Specifications".

2. Manual of Traffic Controls for Construction and Maintenance Work Zones, California Department of Transportation, latest edition, herein referred to as "Traffic Control Manual".

B. Comply with the State of California, Department of Health Services, regarding the separation of water and sewer lines.

1.4 SUBMITTALS

A. Materials List/Data: Provide the following:

1. Materials list of items proposed to be provided under this Section. These items must also be on the WAS Approved Materials List.
2. Manufacturer’s specifications and other data needed to prove compliance with the specified requirements.

B. Operation and Maintenance Documents

1. Deliver five (5) hard copies and one (1) electronic copy of operation and maintenance manuals, for all equipment provided, to Architect.
2. All tools for equipment maintenance and operation shall be presented to Architect in CADD.

C. Record Drawings

1. Upon completion of work deliver provide "As-Built" Drawings to Architect

D. Shop Drawings

1. Submit shop drawings to show compliance with Contract Documents, including but not limited to:
   a. Supports, anchorage and restraints.
   b. Piping transition details
   c. Special installation requirements
   d. Deviations

E. Test Reports

1. Submit copies of structural integrity, leakage, and performance test data in the number and as required by Division 1 and this Section.

1.5 QUALITY ASSURANCE

A. Provide certifications of compliance with these Specifications for the materials used.

1.6 PRODUCT HANDLING

A. Protection

1. Deliver, store and handle all products in a manner to prevent damage and deterioration.
2. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacements

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of Architect and at no additional cost to the Developer.

1.7 SITE CONDITIONS

A. The Drawings are diagrammatic, but shall be followed as closely as actual construction permits. All deviations from Drawings required to make this work conform to the site conditions, and to the work of others, shall be made as necessary or as required by Architect.

B. Contractor shall be responsible for verification of existing utilities in all areas where work is to be performed. Contractor shall exercise extreme caution to protect existing structures and utilities during trenching and installation

1.8 PRELIMINARY OPTERATION

A. The Architect reserves the right to operate any systems or equipment prior to final completion and acceptance of the work. Such preliminary operation shall not be construed as an acceptance of any work.

PART 2 – PRODUCTS

2.1 PIPE

A. Polyvinyl Chloride (PVC) Pipe

1. Pipe three (3) inches and less in diameter shall be polyvinyl chloride 1120, SDR26, or polyvinyl chloride pipe, Schedule 40, in accordance with ASTM standards D1784, D2241, D2665 and NSF approved.
2. Polyvinyl chloride pipe larger than three (3) inches in diameter shall meet the requirements of AWWA C900. Pipe shall be class 150 conforming to the requirements of DR18.
3. Fittings for pipe larger than three (3) inches in diameter shall be cast iron, class 250; they shall conform to AWWA C-110, shall be coated with liquid epoxy coating per AWWA C-210 or a cold applied petroleum wax tape system per AWWA C-217.
4. Interior of all fittings shall be cement mortar lined in accordance with AWWA Specification C-104.
5. Manufacturers: J-M Manufacturing Company, Inc., Pacific Western, or equal.

2.2 VALVES

A. Gate valves

1. Valves 3 inches and larger shall be iron body, bronze mounted, parallel seat, double disc, non-rising stem and shall comply with AWWA Specification C-500. Valves 3 inches through 12 inches shall be rated for working pressure of 200 psi. Valves shall have connections suitable for pipe connections; they shall be coated with liquid epoxy coating per AWWA C-210 or a cold applied petroleum wax tape system per AWWA C-217.
2. Valves 2-1/2 inches and less shall have bronze union bonnet, solid wedge, non-rising stem; 125 lb.
3. Manufacturers:
   a. 3 inches and larger; See WAS Approved Materials List
   b. 2-1/2 inches and less; See WAS Approved Materials List

B. Resilient Seat Gate Valve

1. 200 psi working pressure.
2. 3 inches through 12 inches (NPS) AWWA C-509.
3. Manufacturers –See WAS Approved Materials List
4. They shall be coated with liquid epoxy coating per AWWA C-210 or a cold applied petroleum wax tape system per AWWA C-217.

C. Valve Boxes

1. Valve boxes for 4 inch and larger valves shall consist of two sections of 8-inch Class 150 P.V.C. pipe joined by coupling, clamp, strap, asphalt saturated felt or other means of holding the two sections together while backfilling to keep the sections lined up and to keep dirt from entering the well.

D. Valve Box Covers

1. Valve box covers shall conform to the Standard Drawings. Covers shall be field coated with two coats of traffic marker yellow, gloss finish, Code No. 1704 California State color; School Bus Yellow/Federal Yellow, Frazee 641 Aro-Plate; Sherwin Williams 338-117; Pervo Paint Company 3232; or equal.

2. Covers shall be seated flush with the surface of the natural ground, or paved surface and shall have a 20-inch square concrete pad 4 inches thick when in unpaved streets or set in open fields.

2.3 BACKFLOW PREVENTION ASSEMBLY

A. The assembly will consist of a reduced pressure backflow prevention assembly that is on the WAS's approved materials list.

2.4 METER BOXES

A. Meter boxes shall be provided to comply with requirements specified on the Standard Drawings or as shown on the Drawings from the approved materials list by the WAS.

2.5 THRUST AND ANCHOR BLOCKS

A. Concrete shall be 470-C-2000.

B. Quantity of concrete and the area of bearings of the pipe and undisturbed soil shall be as shown on the Standard Drawings, project Drawings, or as directed by Architect.

C. Thrust blocks shall comply with the requirements of NFPA 24.

2.6 FIRE HYDRANTS

A. Fire hydrants shall have two 4-inch ports and one 21/2-inch port.

B. Manufacturers: Clow, Long Beach Iron, James Jones, Mueller or equal.

2.7 POST INDICATORS VALVES

A. Underground post indicator valves shall be either flanged end or have mechanical joint connections to pipeline and conform to both UL and FM standards for fire protection valves. The valves shall be resilient seated gate valves constructed with ductile iron bodies and bonnets.

B. Underground valves shall have 2" square ductile iron wrench nut to allow separate operation of the valve even if traffic damage occurs to the connecting indicator post. Valve stem and upper two O-rings shall be replaceable without having to remove valve bonnet.

C. The vertical indicator post shall be mounted to the gate valve and set for the corresponding number of turns required to open/shut the valve. The post shall have a wrench or a hand wheel that can be locked to the post to prevent unauthorized use.

D. Length of post shall be determined by the depth of pipeline bury as well as valve diameter.

E. Post indicators must be Underwriters Laboratories listed and Factory Mutual Research Corporation approved for use in fire protection systems.

F. American Flow Control, Kennedy or equal.

PART 3 – EXECUTION

3.1 SYSTEMS LAYOUT

A. Layout the system determining proper elevations for all components from the lines and grades shown on the Drawings.

3.2 EXCAVATING, BACKFILLING AND COMPACTING

A. Comply with the requirements specified in Division 1 and related work specified elsewhere in these Specifications.

3.3 INSTALLATION

A. General

1. Install pipe, fittings, appurtenances and other system components to meet requirements of the Standard Specifications and in accordance with the Standard Drawings, except as modified herein or shown on the Drawings.
2. Install materials specified in accordance with Section 306-1 "Open Trench Operations" of the Standard Specifications and the Specifications.
3. Cover pipe four (4) inches and larger with 36 inches minimum cover over top of pipe.
4. Cover pipe three (3) inches and less with 24 inch minimum cover over top of pipe.

B. Cutting, Milling or Beveling Pipe

1. Cutting, milling or beveling shall be accomplished with special tools intended for such use to create a machined end equal in workmanship to the milled or beveled ends of the pipe as furnished by the manufacturer.
2. Milling or beveling shall not result in undercutting the pipe wall thickness and machined pipe will be approved by Architect prior to installation.

C. Assembling Couplings

1. Clean all connecting parts of the pipe, rings, couplings and castings before assembly.
2. Assemble couplings, after bearing has been obtained, in accordance with manufacturer's recommendations. Use of excessive lubricant will not be permitted

D. Joining With Cast Iron Fittings

1. Fittings shall be independently supported.
2. Short lengths of pipe shall be used in and out of each rigid joint or rigid structure. In joining with a rubber ring type fitting, the length of pipe shall be not less than 1-1/2 feet. In joining any caulked type cast iron fitting, the length of pipe shall be 1-1/2 to 3-1/4 feet for 6 inch and smaller pipe and 1-1/2 to 6-1/2 feet for 8 inch and larger pipe.
3. Where rubber ring fittings are used, the pipe must have a machined end in accordance with the manufacturer's recommendations.
4. When connecting to mechanical joint or flanged fittings, a beveled spigot is not required. Cut off beveled end of pipe prior to insertion into mechanical joint fitting.
5. Where flanged fittings are used, the nuts and bolts shall be coated with NO-OX-ID grease in buried installations and the threads lubricated with graphite and oil in exposed installations. NO-OX-ID grease manufactured by Dearborn Chemical Division of W.R. Grace and Company, or equal (no known equal).

E. Placing Concrete Thrust and Anchor Blocks

1. Install thrust or anchor block at all valves and at all fittings for pipe larger than 2 inches diameter.
2. Install thrust or anchor block on all dead-ends and tees and crosses having one or more openings capped.
3. Pre-compact the surrounding soil prior to placing concrete if the thrust exceeds the bearing value of the soil.
4. Coat steel tie rods and pipe clamps, if used, with one coat Koppers 11-S primer, or equal, (no known equal).
5. Place concrete thrust and anchor blocks between undisturbed ground and the pipe, valves, and fittings to be anchored.
6. Place concrete, unless specifically shown otherwise, so that pipe joints and fittings will be accessible for repair.
7. Allow concrete supports to cure for at least three (3) days prior to backfilling the supported section of pipe.

F. Preventing Foreign Matter From Entering Pipe

1. Close open end of pipe, at all times when pipe laying is not in progress, by a wooden plug or other means approved by Contractor.

3.4 INSPECTION OF WORK

A. General

1. Work performed and materials and equipment furnished and installed, as shown on the Drawings or required by these Specifications, shall be subject to inspection by Padre Dam and the Architect.
2. Provide Developer with unrestricted access to the work during construction to allow him the opportunity to inspect the work.
3. Notify Architect a sufficient period of time prior to the manufacture or production of materials or equipment, in order that arrangements may be made for shop or plant inspection or testing of the items to be supplied.

3.5 SAMPLES

A. Material and Equipment

1. Provide source of supply for each material and type of equipment, for approval by the Architect, prior to delivery to the site and incorporation into the work.
2. Tests of materials and equipment will be made in accordance with recognized standards of national organizations and such special methods and tests as prescribed in these Specifications.
3. Submit samples as specified, or as may be requested by Architect, without cost to Owner.

3.6 FIELD TESTING

A. Pressure Test

1. Fill the potable water line with water at least 72 hours prior to testing. While filling and immediately prior to testing, expel all air from the pipeline. Where air valves or other suitable outlets are not available for releasing air or applying the test, install taps and fittings approved by Engineer of Record.
   a. The maximum length of pipe to be included in any one test shall not be more than 2,500 feet or the distance between valves, whichever is greater.
   b. The pipe shall be tested twice as described below. Plan joint completion to accommodate temporary test bulkheads for pressure testing.
      1. The first test shall be as specified in National Fire Protection Association (NFPA) Standard 24, Sections 8-8 and 8-9. Note that this test shall be conducted prior to backfill. All joints shall be visible and pipe shall be center loaded only.
         a. All joints shall be exposed. The trench shall be backfilled between joints to prevent movement of the pipe.
         b. Test pressure: shall be a minimum of 200 psi or 50 psi in excess of the pressure rating of the pipe, whichever is greater.
         c. The test pressure shall be maintained for two hours.
         d. The amount of leakage shall be measured at the specified test pressure by pumping from a calibrated container. The amount of leakage at the joints shall not exceed two quarts per hour per 100 gaskets or joints irrespective of pipe diameter.
         e. The amount of allowable leakage may be increased by one fluid ounce per inch valve diameter per hour for each metal seated valve isolating the test section.
      2. The second test shall be performed after the pipe trench has been completely backfilled. The test shall be conducted per UNI-BELL 3-88, Section 5.4.4.
      a. The test pressure shall be maintained for one hour.

B. After final pressure test, open each fixture or outlet to maximum flow and run until the discharged water is free from particulates.

1. Flow rates for flushing:
    a. 4" - 400 gpm
    b. 6" - 750 gpm
    c. 8" - 1000 gpm
    d. 10" - 1500 gpm
    e. 12" - 2000 gpm

3.7 DISINFECTION

A. The domestic water pipeline and appurtenances shall be disinfected in accordance with Section 331300 of these Specifications.

END OF SECTION 331000

SECTION 33 13 00

DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Potable water systems are those systems which carry domestic water from the supply main without isolation of the branch by a backflow prevention device. Install all plumbing fittings and valves necessary to perform the disinfection.

B. Disinfect the designated water system in compliance with the procedures described in Article 3.2 of this Section.

C. Sample water in system following completion of procedure and provide a bacteriological analysis of the water.

1.2 REQUIRMENTS OF REGULATORY AGENCIES

A. For work done on public property, comply with the requirements of governmental authorities having jurisdiction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Use Chlorine, applied in liquid form into the system being disinfected. Chlorine gas or a hypochlorite solution may be used to make up the disinfecting liquid.

PART 3 – EXECUTION

3.1 PRELIMINARY PRPEPARATION OF THE SYSTEM

A. Provide within 3 feet of the supply main, an injection port for introducing the chlorine solution and gate valve upstream from the injection port.

B. There shall be no dead-end sections in the system exceeding three feet in length. All branches within the system shall lead to an outlet for bleeding and flushing.

C. After final pressure tests, open each fixture or outlet to maximum flow and run until the discharged water is free from particulates.

3.2 CHLORINATION PROCEDURE

A. Notify Architect at least 5 working days prior to the start date of chlorination.

B. Install all fixtures to be served by the potable water system before start of chlorination.

C. Prior to injection, place signs on each fixture being treated, reading "Heavily Chlorinated Water - Do Not Use."

D. Introduce the chlorine into the supply stream at a rate to provide a uniform concentration of chlorine in the entire system. Maintain at least 50 ppm chlorine level at each fixture after a hold period of 24 hours. Do not exceed 150 ppm at any time.

E. Draw the injected chlorine in the system through each outlet and fixture until the specified concentration level is reached. Then close all valves including the service cock and supply valve. Keep the system closed during the 24 hours hold period.

F. The Subcontractors Laboratory will test for the residual concentration in the system at the end of 24 hours. Release no water from the system until these samples are taken. A minimum concentration of 50 ppm of chlorine is required to all chosen sampling points.

G. After approval to proceed, flush the system at a relatively high velocity to remove the injected chlorine to a concentration in the system of no more than 0.5 ppm above that in the normal supply. Dispose of the chlorinated water to a public sewer system.

H. After approval to proceed, secure the entire system for at least 3 days prior to taking sample for bacteriological analysis.

3.3 SAMPLING AND NOTIFICATION

A. At the completion of the 3 day hold period, take bacteriological water samples with observation by the Architect.

B. Sample bottles must be provided by the laboratory. After the samples have been collected, the Architect may allow temporary use of the water system pending results of the bacteriological analysis of the samples. The system cannot be used unless such allowance is given.

C. Upon completion of sampling, submit the certificate of completion to the Architect for approval.

3.4 ANALYSIS

A. Perform qualitative and quantitative bacterial analysis on the water samples and submit a laboratory report. The report must include the presence of any E. Coli bacteria in a 100 ml sample (this must be negative to be acceptable) and a total plate count of bacteria per cc of the sample (the count must be less than 100, or equal to the supply).

3.5 FINAL ACCEPTANCE

A. Upon satisfactory completion of all procedures and receipt of acceptable bacteriological results, written approval of the system will be provided by the Architect. Failure to fully comply with the above procedures will result in a requirement to repeat the procedure until acceptable results are achieved, at no additional cost to the Owner.

END OF SECTION 331300

SECTION 33 30 00

SANITARY SEWERAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: This Section includes gravity-flow, non-pressure sanitary sewerage outside the building(s) complete with cleanouts, manholes, piping, from points of connection to the interior plumbing system of the building to the existing sewage mains.

B. Related Sections

1. Trenching backfilling and compacting work is specified in Section 31 23 00.

1.02 REFERENCES

A. The editions of the specifications and standards referenced herein, published by the following organizations, apply to the cast in place concrete only to the extent specified by the reference.

1. American Concrete Institute (ACI)
2. American Society for Testing and Materials (ASTM)
3. ASME International

1.03 SUBMITTALS

A. Quality Assurance/Control Submittals:

1. Product Data: Submit manufacturer's catalog cuts of pipe, fittings, and joints.
2. Shop Drawings: Submit plans, elevations, sections, details, for cleanouts, and manholes including frames, and covers.

1.04 QUALITY ASSURANCE

A. Materials and installation shall be in accordance with the following documents hereinafter referred to as the "Standard Specifications".

1. Water Agency Standards, Standard Specifications for Water, Recycled Water and Sewer Facilities.
2. San Diego Regional Standard Drawings.
3. Standard Specifications for Public Works Construction, 2018 edition, including the 2012 Regional Supplement Amendments, herein referred to as "Standard Specifications".

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Do not store materials directly on the ground. Support the pipe uniformly during shipping and storage. Do not stack higher than 4 feet nor stack with weight on bells. Cover plastic pipe to protect it from sunlight. Keep inside of pipe and fittings free of dirt and debris. Avoid scratching the pipe surface.

B. Do not install pipe that is cracked, broken, gouged, scratched or forming a clear depression. Remove damaged pipe from the site.

1.06 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two weeks in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Architect's written permission.

PART 2 – PRODUCTS

2.01 PIPE AND FITTINGS

A. Vitrified Clay Pipe: Comply with Section 207 8 of the Standard Specifications.

B. Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: Comply with Section 207 17 of the Standard Specifications.

2.02 RELATED MATERIALS

A. Precast Concrete Units: Manhole sections shall meet the requirements of ASTM C 478 97 except that Portland cement shall be Type II, low alkali.

B. Manhole Frame and Cover Sets: Comply with subparagraph 206 3.3 of the Standard Specifications.

C. Painting: Castings and steel fabrications shall be given one coat of bituminous paint.

D. Concrete Appurtenances: Concrete for cast-in-place manholes shall be 2500 psi at 28 days and conform to Section 03300. Reinforcing steel is specified in Section 03200.

E. Gaskets: ASTM F 477-02, elastomeric seals.

F. Special Pipe Couplings and Fittings: Provide couplings and adapters to make joints between different pipe materials and between different sizes of pipe with standard manufactured adapters and fittings intended for that purpose.

2.03 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:

1. Medium Duty: In un-paved foot-traffic areas.
2. Heavy Duty: In on-site paved areas.
3. Extra-Heavy Duty: In roads.
4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74-05, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine trench bottom to ensure that it is accurately graded to provide uniform bearing and to support pipe, and a uniform slope of not less than 0.2 percent unless otherwise.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Excavate for pipe hubs. Remove unsuitable soils or rock to depths deemed necessary.

B. Where pipe connects into manhole walls, sleeves may be installed in the forms; after the forms are removed, the pipe shall be dry packed in place.

3.03 INSTALLATION

A. Pipe and Fittings Install pipe and fittings according to Section 306 of the Standard Specifications.

B. Manholes: Install precast manhole sections according to ASTM C 891 90. Provide gaskets at joints between sections.

C. Cleanouts: Construct cleanouts of pipe and fittings extended to grade and provide ferrule and countersunk cleanout plug.

3.04 CLEANING

A. Rodding Sewers: All sanitary sewer lines shall be rodded out. Rodding shall be accomplished utilizing a rotary cutter that shall be full size of pipe being cleaned. The lines shall be flushed simultaneously. Rodding shall not take place until building is complete, but before occupancy. This construction shall be done in the presence of the Inspector.

END OF SECTION 333000

SECTION 33 40 00

STORM DRAINAGE SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Section covers underground storm drainage system complete including the following:

1. Connection to the foundation and roof drain lines
2. Catch basins, cleanouts, manholes, and piping.
3. Bioswales/Biofiltration Basins

B. Related Sections

1. Trenching backfilling and compacting work is specified in Section 31 23 00.

1.02 REFERENCES

A. The editions of standards and specifications published by the following organizations, and referenced herein, apply to the work only to the extent specified by the reference.

1. American Concrete Institute (ACI)
2. American Society for Testing and Materials (ASTM)
3. ADS, Inc Product Specifications for HDPE N-12® WT IB PIPE
4. “Update Geotechnical Report, Aperture” prepared by Geocon Geotechnical dated March 30, 2018

1.02 SUBMITTALS

A. Quality Assurance/Control Submittals: Submittal procedures and quantities for the following are specified in Section 01 40 00.

1. Product Data: Submit manufacturer's catalog cuts of pipe, fittings, and joints.
2. Shop Drawings: Submit plans, elevations, sections, details for area drains, curb inlets, catch basins, cleanouts, and manholes including frames, grating, and covers.

1.03 QUALITY ASSURANCE

A. All reinforced concrete drainage installations (structures and pipes) including materials installed within the public right of way shall be in accordance with the following documents hereinafter referred to as the "Standard Specifications".

1. Standard Specifications for Public Works Construction, 2018 Edition, including Regional San Diego Standard Drawings Supplement.
2. San Diego Regional Standard Drawings, latest edition.

B. All high density polyethylene pipe installations shall be in accordance with ADS N-12® WT IB pipe specifications.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Do not store materials directly on the ground. Support the pipe uniformly during shipping and storage. Do not stack higher than 4 feet nor stack with weight on bells. Cover plastic pipe to protect it from sunlight. Keep inside of pipe and fittings free of dirt and debris. Avoid scratching the pipe surface.

B. Do not install pipe that is cracked, broken, gouged, scratched or forming a clear depression. Remove damaged pipe from the site.

C. Hoist pipe with mechanical equipment using a cloth belt sling or a continuous fiber rope that avoids scratching the pipe. Pipes may be lowered by rolling on two ropes controlled by snubbing.

1.05 SITE CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

B. Notify Architect no fewer than two weeks in advance of proposed interruption of service.

C. Do not proceed with interruption of service without Architect's written permission.

PART 2 – PRODUCTS

2.01 PIPE AND FITTINGS

A. Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: Comply with Section 207 17 of the Standard Specifications.

B. Reinforced Concrete Pipe (RCP): Comply with Section 207 2 of the Standard Specifications.

C. High Density Polyethylene Pipe (HDPE): Comply with ADS N-12® WT IB Pipe Specifications

2.02 SUBSURGANCE DRAIN PIPE

A. Perforated Polyvinyl Chloride (PVC) Pipe: ASTM D 3034 06, SDR 35, may be used where height of fill above pipe does not exceed 35 feet.

2.03 RELATED MATERIALS

A. Precast Concrete Units: Catch basins and inlets shall meet the requirements of ASTM C 913 02 and manhole sections shall meet the requirements of ASTM C 478 97 except that Portland cement shall be Type II, low alkali.

B. Castings: Manufacture castings true to pattern free from blowholes, porosity, hard spots, shrinkage distortion or other defects. Castings shall be of gray iron, ductile iron or steel as indicated or as required to withstand loadings.

1. Grey Iron Castings: Meet the requirements of ASTM A 48 03, Class 35.
2. Ductile Iron Castings: Meet the requirements of ASTM A 536 84, Grade 60 40 18.
3. Steel Castings: Meet the requirements of ASTM A 27 05 for mild to medium strength castings and ASTM A 148 01 for high strength castings.
4. Fabricated Steel Gratings and Frames: Fabricate from steel meeting the requirements of ASTM A 36 05 or ASTM A 576 90b, Grades 1021, 1022, 1026, 1029 or 1030. Welding shall meet the requirements of AWS D1.1 02. Burrs, rough and sharp edges, and other flaws shall be removed. Warped pieces shall be straightened after all fabrication. Grates used in walkways must be ADA compliant.
5. Manhole Frame and Cover Sets: Comply with subparagraph 206 3.3 of the Standard Specifications.
6. Painting: Castings and steel fabrications shall be given one coat of bituminous paint.

C. Filter Fabric: Provide non-woven polyester fabric. Provide one of the following products or equal product approved according to Section 01600:

1. Crown Zellerbach; Fibertex 200
2. Celanese Fibers; Mirafi 140
3. DuPont; Typar

D. Filter Material: Clean coarse sand and gravel or crushed stone 3/4-inch minimum to 1 1/2 inch maximum, free draining.

E. Concrete Appurtenances: Concrete for cast-in-place catch basins and manholes shall be 2500 psi at 28 days and conform to concrete and reinforcing per 32 05 23.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine trench bottom to ensure that it is accurately graded to provide uniform bearing and to support pipe, and a uniform slope of not less than 0.2 percent unless otherwise.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. All drains, lids, rims, ect located in asphalt or concrete slab areas shall be adjusted by contractor after completion of the paving.

3.02 PREPARATION

A. Excavate for pipe hubs. Remove unsuitable soils or rock to depths deemed necessary.

B. Where pipe connects into manhole walls, sleeves may be installed in the forms; after the forms are removed, the pipe shall be dry packed in place.

3.03 INSTALLATION OF SUBSURFACE DRAINS

A. Bedding: Line the trench with filter fabric with joints in fabric lapped not less than 4 inches. Cover the bottom of the trench, full width, with 4 inches of filter material.

B. Pipe Laying: Lay pipe with perforations at the bottom and with sections joined with couplings that will hold pipe firmly in place without the use of sealing compounds or gaskets. Cutting and machining of asbestos pipe shall be done in accordance with OSHA and Governing Air Quality Control Regulations.

C. Backfilling: Place filter materials over the pipe to the height indicated and wrap filter fabric over the top of the material.

3.04 INSTALLATION OF STORM DRAINS

A. Bedding: Bedding for storm drainage pipe is specified in Section 31 00 00 - Earthwork.

B. Pipe and Fittings: Install pipe and fittings according to Section 306 of the Standard Specifications.

C. Manholes and Catch basins: Install precast manhole and catch basin sections according to ASTM C 891 90. Provide gaskets at joints between sections.

D. Cleanouts: Construct cleanouts of pipe and fittings extended to grade and provide ferrule and countersunk cleanout plug.

3.05 INSTALLATION OF BIOSWALE

A. Bedding: Line the trench with filter fabric with joints in fabric not less than 4 inches. Filter fabric should be class 'C' – apparent opening size (ASTM-D-4751), GRB tensile strength (ASTM-D-4632), puncture resistance (ASTM-D-4833). Cover the bottom of the trench, full width, with 6" filter material, 1" maximum open-graded aggregate 3 cubic ft./ft.

B. Pipe and Fittings: Install 4-inch minimum diameter, perforated, thick walled schedule 40 PVC.

C. Backfill: Cover pipe with 6-inches of 1" max open-graded aggregate 3 cubic ft/ft. Wrap filter fabric over the top of backfill. The add two feet minimum of permeable soil, classification ML, SM, SC per United States soil Conservation Service Classification.

END OF SECTION 33 40 00

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

MASTER ENVIRONMENTAL IMPACT REPORT (EIR)

City of San Diego
Development
Services
Department

Land Development
Review Division
(619) 236-6460

BINDER

MASTER
Environmental Impact Report

LDR No. 96-7918
SCH No. 97111077

SUBJECT: **PACIFIC HIGHLANDS RANCH (SUBAREA III) SUBAREA PLAN in the NORTH CITY FUTURE URBANIZING AREA (NCFUA).** GENERAL PLAN AMENDMENT, NCFUA FRAMEWORK PLAN AMENDMENT, SUBAREA PLAN, MASTER REZONE, MULTIPLE HABITAT PLANNING AREA (MHPA) BOUNDARY ADJUSTMENT, DEVELOPMENT AGREEMENT, and LOCAL COASTAL PLAN AMENDMENT to develop 4,974 residential units (with potential increases up to 5,456 units depending on the need for school facilities and concomitant redesignation of school sites to residential uses); a Town Center with commercial, park, open space, residential and civic area components; elementary, junior high, and high schools; a ~~police substation~~ double fire station; a library; and associated public facilities and transportation network on approximately 2,652 acres. Pacific Highlands Ranch (Subarea III) is located within the NCFUA, and abuts the northerly limits of the Rancho Peñasquitos community and Black Mountain Park. Del Mar Mesa (Subarea V) and Carmel Valley are to the south, Subarea IV is to the east, Subarea II is to the west, and Fairbanks Ranch and La Zanja Canyon are to the north. The project area includes portions of Del Mar Mesa, McGonigle Canyon, Deer Canyon, Black Mountain Road, and the proposed State Route 56 freeway corridor (portions of Sections 7,8,9,10,11,15,16, and 22, Range 3 West, Township 14 South, Del Mar Quadrangle, San Bernardino Base Map). Applicant : Pardee Construction Company.

CONCLUSIONS:

Note: Subsequent to the preparation of the Draft MEIR, the Pacific Highlands Ranch Subarea Plan was revised. The revisions are considered minor in scope and do not affect the environmental analysis or conclusions of the Draft MEIR as previously presented. Changes to the document are shown in strikeout/underline format.

The proposed Pacific Highlands Ranch Subarea Plan comprises the City of San Diego's statement of policy for growth and development of the Subarea III planning area, one of five subareas designated by the North City Future Urbanizing Area (NCFUA) Framework Plan. The Pacific Highlands Ranch plan proposes a land use plan and an open space system in general compliance with the requirements of the

Framework Plan for the NCFUA and the City of San Diego's Multiple Species Conservation Program (MSCP).

This Master Environmental Impact Report (MEIR) analyzes two separate land use plans developed around the two proposed northern alignments for the middle segment of State Route (SR) 56. The proposed Subarea 1 Plan incorporates the proposed SR-56 Alignment "F" and the proposed Subarea 2 Plan includes the proposed SR-56 Alignment "D," as described in the SR-56 revised EIR prepared by the City of San Diego. (It is anticipated that the SR-56 project will go to public hearing in late spring or early summer of 1998.) A Resource Protection Ordinance (RPO) analysis and Council Policy 600-40 development suitability analysis have been prepared for both subarea plans.

Subarea Plan 1 (SR-56 Alignment "F")

The majority of development as proposed by this subarea plan would occur north of the SR-56 alignment. Plan 1 would include a 33-acre ~~Town Center and~~ Village area consisting of commercial and retail uses and high density residential; a 20-acre employment center, 152 acres for three elementary schools, one junior high and an optional junior high school, and two high schools (one private and one public); a 24-acre park site; a 6 5-acre ~~town green~~ civic use area with a library; a ~~1,280~~ 1,268-acre Multi Habitat Planning Area (MHPA); 203 acres for SR-56 and major roads; 12 acres of Very Low Density Residential (0.25-1 dwelling unit per acre); 544 acres of Low Density Residential (2.5-5 dwelling units per acre); 143 acres of Peripheral Residential (5.1-9 dwelling units per acre); and 60 acres of Core Residential (9.1-14 dwelling units per acre); and 33 acres of ~~Town Center~~ Village (34 dwelling units per acre). Existing or approved projects account for 175 acres within the planning area.

The number of new residential units would be 4,974. This number could increase to a maximum of 5,456 if the private school site does not develop as a school, and if it is determined that a junior high and a ~~fourth~~ third elementary school are not needed, and if these sites are redesignated for residential use. The major circulation element roads would consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and the SR-56 Alignment "F" freeway corridor. The development and grading for Subarea Plan 1 would cover approximately 50 percent of the 2,652-acre subarea. The remaining acreage would be an open space preserve, including a trail system, which is functionally equivalent to the Multiple Habitat Planning Area (MHPA) shown in the City of San Diego's MSCP Subarea Plan.

Subarea Plan 2 (SR-56 Alignment "D")

The SR-56 alignment shown on this subarea plan traverses the subarea in a diagonal manner, roughly bisecting the proposed development area, with most of the higher density uses occurring on the south side of SR-56. Subarea Plan 2 would include a ~~32~~ 33-acre ~~Town Center~~ Village with the same uses as described in Subarea Plan 1; a 16-acre employment center; 154 acres for three elementary schools, one junior high and an optional junior high school, and one public and one private high school; 30 acres for park sites; a 6 5-acre ~~town green~~ civic use area with a library and; a ~~1,298~~ 1,266-acre MHPA; ~~190~~ 205 acres for SR-56 and major roads; 12 acres of Very Low Density Residential; 535 acres of Low Density Residential; 147 acres of Peripheral Residential; 55 acres of Core Residential; and ~~32~~ 33 acres of Town Center Village.

The number of new residential units would be the same as for Subarea Plan 1, with a potential increase to a maximum of 5,414 units resulting from the redesignation scenario described above. The major circulation element roads would include Carmel

Valley Road, Del Mar Heights Road, Camino Santa Fe, and the SR-56 Alignment "D" freeway corridor.

Multiple Species Conservation Program (MSCP)

The City of San Diego adopted the MSCP on March 18, 1997. The MSCP is designed to conserve a connected system of biologically viable habitat lands in a manner that maximizes the protection of sensitive species and precludes the need for future listings of species as threatened or endangered. These targeted habitat lands are identified in the City's MSCP Subarea Plan as Multiple Habitat Planning Areas (MHPAs).

Approximately 1,510 acres of Pacific Highlands Ranch lies within the City of San Diego MHPA Northern Area. In order to implement the proposed subarea plan, some encroachment into the MHPA would be necessary; therefore, an MHPA Boundary Adjustment is proposed by the applicant. This action would amend the City's MHPA to add high quality habitats located in Carmel Valley Neighborhood 8A and Subarea V of the NCFUA into the preserve system; remove other less sensitive areas within Pacific Highlands Ranch and Carmel Valley Neighborhood 10; and confer Third Party Beneficiary Status on the applicant. The proposed adjusted MHPA would be functionally equivalent or superior to the adopted MHPA. The analysis to support this conclusion is provided in this MEIR in the Land Use and Biological Resource sections.

SIGNIFICANT UNAVOIDABLE IMPACTS:

Implementation of the Pacific Highlands Ranch Subarea Plan would ultimately result in unavoidable significant land use impacts in the form of inconsistencies with the RPO development regulations regarding the preservation of important cultural resources and wetlands; and the General Plan goals of retention of premium agriculturally productive lands in agricultural use and development of a transportation system that is in balance with the types and intensities of land uses that it serves; and the NCFUA Framework Plan guiding principle of designing and constructing the NCFUA transportation system so that it will not result in severe impacts to adjoining communities. Traffic resulting from the implementation of the subarea plan would result in direct and cumulative impacts on the I-5 and I-15 freeways and on road segments and intersections within and outside of the subarea. Implementation of the plan would result in unavoidable significant cumulative impacts to wetlands and native grasslands. Unavoidable significant cumulative downstream water quality impacts would occur as a result of additional impermeable surfaces and urban runoff. An unavoidable significant direct and cumulative change in the landform and visual character of the subarea would also occur. The visual character of the area would substantially change with implementation of the Plan, as the current very low intensity of rural, residential, and agricultural uses would be replaced with a maximum of 5,456 new dwelling units with associated infrastructure and commercial and civic uses. The project would result in the significant cumulative loss of important, non-renewable cultural resources. Unavoidable significant cumulative air quality impacts would occur as a result of the additional traffic on circulation element roadways and SR-56. Unavoidable significant direct and cumulative impacts to important agricultural land and cumulative impacts to the ability to extract mineral resources in the region would occur due to the development of agricultural land and land containing valuable mineral resources. Adoption of the No Project alternative would avoid the above significant direct and cumulative impacts resulting from implementation of the subarea plan.

SIGNIFICANT IMPACTS LIKELY TO BE MITIGATED WITH FUTURE PROJECT LEVEL REVIEW THROUGH THE PACIFIC HIGHLANDS RANCH SUBAREA PLAN (SUBAREA III) MITIGATION, MONITORING AND REPORTING PROGRAM:

The Pacific Highlands Ranch Subarea Plan is a planning document containing both policy and regulations and is intended to be the City's statement of policy for growth and development of the subarea. The analysis of environmental impacts is consistent with this level of planning. This EIR builds on the previously certified EIR for the Framework Plan and provides the basis for review and analysis of future projects within the subarea. Potentially significant impacts are identified; and a framework for future impact analysis and ~~mitigation is~~ a Mitigation, Monitoring and Reporting Program (MMRP) are provided. ~~Identified mitigation measures~~ Implementation of the MMRP will be required of future projects. It is expected that the following significant impacts could be lessened and/or fully mitigated with implementation of the ~~identified mitigation measures~~ MMRP.

Transportation/Traffic Circulation: Direct and cumulative impacts to freeways, intersections and roadway segments as a result of development.

Biological Resources: Direct, indirect, and cumulative impacts to upland habitats and sensitive species including up to 19.6 acres of Tier I habitats (southern maritime chaparral and native grasslands); 21.7 acres of Tier II habitats (coastal sage scrub and coyote brush scrub); 43.7 acres of Tier III habitats (chaparral and annual grasslands); 1.3 acres of wetlands; 14 sensitive plant species including California adolphia, Del Mar Manzanita, San Diego sagewort, Brewer's calandrinia, white coast ceanothus, prostrate spineflower, summer holly, western dichondra, coast barrel cactus, Palmer's grapplinghook, San Diego marsh-elder, San Diego golden star, Nuttal's scrub oak, and pygmy spikemoss; one pair of coastal California gnatcatchers, two orange-throated whiptail lizards, an undetermined number of grasshopper sparrow, southern California Rufous-crowned sparrow, Bell's sage sparrow, California horned lark, loggerhead shrike, Cooper's hawk, sharp-shinned hawk, turkey vulture, and white-tailed kite occurring within the area designated for development.

Hydrology/Water Quality: Direct impacts on flood control and urban runoff from development and on downstream water quality from increased impervious surface, erosion, sedimentation and pollutants.

Cultural Resources: Direct impacts to important significant cultural resources as a result of development.

Geology/Soils/Erosion: Direct impacts on development from ancient landslides, expansive soils, unstable cut slopes, alluvial soils, poorly consolidated soils, and seismic events. Direct and cumulative impacts from exposure of highly erodible soils through future grading.

Paleontological Resources: Impacts to significant fossil resources throughout the subarea as a result of future grading.

Noise: Direct noise impacts from future traffic.

Public Facilities and Services: Direct and cumulative school impacts from increased student population in districts where overcrowding already exists.

Direct impacts on the Fire Department's ability to provide a first response to an incident within six minutes.

Direct and cumulative impacts on the ability to provide water and sewer services to the subarea without substantial upgrade of existing systems.

Direct and cumulative solid waste impacts resulting from construction activities and approved development.

Public Safety: Direct impacts from pesticides and herbicides that may have been used for agricultural activities in areas designated for development.

Direct impacts from the potential for mosquito breeding in ponded water and detention basins.

ALTERNATIVES FOR SIGNIFICANT UNAVOIDABLE IMPACTS:

Four alternatives were developed which would reduce identified impacts on an individual and/or cumulative basis. The first alternative (Alternative Site Designs) contains two options and the third alternative (Development Without a Phase Shift) contains three options. These alternatives are briefly described below:

ALTERNATIVE SITE DESIGNS:

Two conceptual site designs were developed by City of San Diego staff. The designs adhere more closely to the land use concept described in the adopted NCFUA Framework Plan. Both designs include a similar number of dwelling units, a mixed use core area consisting of commercial uses, a community park, various residential densities, and a civic area; a high school, a fire station; a police substation; and the associated public facilities and transportation network. Both site designs also include moderately low residential densities (1.1-2 units per acre), which are not included in the proposed Pacific Highlands Ranch (Subarea III) Plan 1. Both of the site designs are very similar, with minor differences in the distribution of residential densities. Each of the designs would reduce direct and cumulative impacts to biological resources by including as open space the northern linkage to La Zanja Canyon in the northwest corner of the subarea and retaining the eastern on-site portions of Gonzales Canyon. However, the significant, unavoidable impacts to land use, wetlands, native grasslands, downstream water quality, landform and visual quality, cultural resources, air quality, agricultural lands and mineral resources would not be substantially reduced.

SR-56 CENTRAL ALIGNMENT ALTERNATIVE:

This alternative would include up to 5,500 residential dwelling units; a Town Center and Village area consisting of commercial uses, retail uses, a community green, high density residential, and a civic area; an employment center; three elementary schools; two neighborhood parks; a community park; one junior high and two high schools (one private and one public); a public library; a fire station; ~~a police substation;~~ and the associated public facilities and transportation network,. Development and grading for this alternative would cover approximately 50 percent of the 2,652-acre subarea. As the SR-56 central alignment would be incorporated, additional disturbance would be required to build the freeway south of the developed area.

Since the freeway would be separated from the community by open space, there would be a reduction in noise impacts to sensitive receptors, and an incremental reduction in air quality impacts due to the straighter alignment of SR-56 and correspondingly fewer miles traveled. The visual impacts associated with noise walls to reduce freeway noises would be almost entirely avoided. This alternative would affect only one important cultural resource site, as opposed to six sites for the proposed "D" alignment

of SR-56 and five sites for the "F" alignment. The central alignment alternative would reduce impacts to about 25 acres of potentially fossil bearing geologic formations.

Unavoidable significant cumulative impacts to air and water quality and cultural resources would remain. In addition, this alignment would impact a larger area of sensitive habitat than the other proposed alignments, and would fragment a portion of the MHPA.

DEVELOPMENT WITHOUT A PHASE SHIFT:

Three concept plans were proposed to address the development that could occur on the property without a phase shift from Future Urbanizing to Planned Urbanizing; that is, at the densities that are currently allowed by the underlying A-1-10 zone. The three non-phase shift scenarios are based on development of one unit per 4 acres on Pardee-owned land pursuant to Council Policy 600-29 and the Planned Residential Development regulations of the Municipal Code, and one unit per 10 acres on the other ownerships within the subarea, using three of the proposed SR-56 alignments (the "D," "F," and Central alignments) . Each of the scenarios would result in 551 dwelling units, a golf course, driving range, clubhouse, and school park.

Each of the three concept plans could lessen the significant impacts to landform alteration and visual quality, as the Town Center, high school, employment center, and various residential densities of the proposed Pacific Highlands Ranch subarea plan would be replaced by a golf course and lower residential densities. The MSCP open space corridor in the northwestern corner of the site would be expanded with the elimination of the low-density development area. This alternative would reduce traffic generation from approximately 55,000-71,010 average daily traffic trips (ADTs) to about 6,660 ADTs. The demand on public services and utilities would be substantially lessened. Other mitigated impacts of the proposed project, including hydrology, cultural resources, geology, paleontology, air quality, noise, and public safety, would be further reduced by implementation of this alternative. However, cumulative water quality and air quality impacts, although reduced, would remain significant. In addition, adoption of any of the three no phase shift scenarios would result in potential significant land use impacts in that such development would be inconsistent with the NCFUA Framework Plan and possibly with RPO, as the community facilities required in the Framework Plan would not be provided, and the potential for impacts to wetlands and important cultural resources would remain. Also, the long-term MSCP preserve regional conservation benefits proposed by the Pacific Highlands Ranch project would not be realized.

RESOURCE PROTECTION ORDINANCE ALTERNATIVE:

This alternative would strictly comply with the encroachment provisions of RPO and eliminate the land use impact associated with the project's inconsistency with RPO. Wetland encroachment and impacts to important cultural sites would be avoided. The number of residential units would be reduced by approximately 50 percent. Because of the smaller development area, impacts in all issue areas would be significantly reduced, although not to below a level of significance in all instances. Aside from land use considerations, this alternative would be environmentally superior to the proposed project.

Unless project alternatives are adopted, project approval will require the decision-maker to make Findings, substantiated in the record, which state that: a) project alternatives are infeasible, and b) the overall project is acceptable despite significant impacts because of specific overriding considerations.

Lawrence C. Monserrate
Environmental Review Manager
Development Services

April 3, 1998
Date of Draft Report

June 11, 1998
Date of Final Report

Analyst: Eileen Lower

PUBLIC REVIEW:

The following individuals, organizations, and agencies received a copy or notice of the draft EIR and were invited to comment on its accuracy and sufficiency:

City of San Diego
Mayor Golding
Councilmember Mathis, District 1
Councilmember Warden, District 5
Development Services
Community and Economic Development
Fire and Life Safety Services
Police Department
Public Works

U.S. Government
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
MCAS Miramar
Department of Agriculture

State of California
State Clearinghouse
Department of Fish and Game
CalTrans, District 11
Department of Health Services
Parks and Recreation Department
Resources Agency
Regional Water Quality Control Board
California Coastal Commission
Department of Water Resources
California Air Resources Board
Boating and Waterways
Native American Heritage Commission
Department of Conservation
State Lands Commission

County of San Diego
Agriculture Department
Air Pollution Control District
Department of Planning and Land Use

Environmental Services Unit
Department of Public Works
County Water Authority

Native Americans
Viejas Group of Capitan Grande Band of Mission Indians
Barona Group of Capitan Grande Band of Mission Indians
Mesa Grande Band of Mission Indians
Santa Ysabel Band of Diegueño Indians
San Pasqual Band of Mission Indians
Jamul Indian Village
Sycuan Band of Mission Indians
Clarence R. Brown, Sr.
Ron Christman
Louie Guassac

Others
City of Del Mar
City of Solana Beach
San Diego Association of Government (SANDAG)
Local Agency Formation Commission (LAFCO)
San Diego Transit Corporation
San Diego Gas & Electric Company
Metropolitan Transit Development Board
San Dieguito River Park JPA
Del Mar Union School District
Poway Unified School District
San Dieguito Union High School District
Solana Beach School District
University of California at San Diego Library
San Diego Association of Environmental Biologists
Sierra Club
San Diego Natural History Museum
San Diego Audubon Society
Environmental Health Coalition
California Native Plant Society
Stuart Hurlbert
San Diego Regulatory Alert
The SW Center for Biological Diversity
Citizens Coordinate for Century III
Endangered Habitats League
Park and Recreation Board
League of Women Voters
Dr. Florence Shipek
Vonn-Marie May
South Coastal Information Center
San Diego Historical Society
San Diego Museum of Man
Save Our Heritage Organization
San Diego County Archaeological Society, Inc.
San Diego State University
California Indian Legal Services
Los Peñasquitos Canyon Preserve Citizens Advisory Committee
Rancho Santa Fe Association
Carmel Valley Community Planning Board
Carmel Valley Trail Riders Coalition

Carmel Mountain Conservancy
Opal Trueblood
Rancho Peñasquitos Planning Board
Friends of Los Peñasquitos Canyon Preserve, Inc.
22nd District Agricultural Association
San Dieguito River Park Citizens Advisory Committee
Torrey Pines Community Planning Group
Fairbanks Ranch Association
Latitude 33
Pacific Business Development Group
Joel Fairbanks
Scott Sandstrom
San Diegans for Responsible Freeway Planning
Rancho Santa Fe Lakes HOA
Subarea III Property Owners
Pardee Construction Company

Copies of the draft EIR, the Mitigation Monitoring and Reporting Program and any technical appendices may be reviewed in the office of the Land Development Review Division, or purchased for the cost of reproduction.

RESULTS OF PUBLIC REVIEW:

( ) No comments were received during the public input period.

( ) Comments were received but the comments do not address the accuracy or completeness of the environmental report. No response is necessary and the letters are attached at the end of the EIR.

(X) Comments addressing the accuracy or completeness of the EIR were received during the public input period. The letters and responses follow.

CITY OF SAN DIEGO
MEMORANDUM

DATE: June 15, 1998

TO: Distribution

FROM: Lawrence C. Monserrate, Environmental Review Manager
Development Services

SUBJECT: Errata Sheet for Pacific Highlands Ranch (Subarea III) Subarea Plan
Final Master Environmental Impact Report (MEIR), LDR No. 96-7918

During the printing of the above-named document, the responses to comments number 322 through 368 (letter of comment from Robert D. Barczewski) were inadvertently misaligned. Attached is the letter with responses to comments appropriately placed. Development Services apologizes for any inconvenience.

Lawrence C. Monserrate
LAWRENCE C. MONSERRATE

Attachment: Robert L. Barczewski letter of comment and City's responses

Distribution: Recipients of Final MEIR

To: Mr Lawrence C Monserrate
Environmental Review Manager
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, Ca 92101

RECEIVED

[illegible]

ENVIRONMENTAL ANALYSIS SECTION

From: Mr Robert D Barczewski
Rancho Del Sol Nurseries, Inc
Zero Energy Systems, Inc.
Trustee, Barczewski Family Trust
6563 Black Mountain Rd
San Diego, Ca 92130

Re: Subarea III phase shift, Draft MEIR

Dear Mr Monserrate:

This will be my third response to the proposed phase shift of Subarea III by the applicant, Pardee Construction Company. Due to the extreme negative impact to Rancho Del Sol, the land owned by the Barczewski Family Trust, Robert D Barczewski, Trustee (under Declaration of Trust dated 8/10/77), this written response is lengthy and many issues are addressed. Also included is a brief history of the land.

322 I attach herewith our previous correspondence, copies of the Rancho Del Sol PRD permit, Planning Commission Resolution, Tentative map, a memo from Cathy Winterrowd to Randi Coupersmith and other pertinent documents. Since the various open space easements, the EIR, my 4-85 application for a GPA (Zero Energy Project), State of California permits, Recorded Rancho Del Sol Subdivision map 12477 are voluminous and on file with the City I

:

Response

322. The referenced background material does not address the adequacy of the MEIR, and has not been physically included in the final document. However, it is incorporated by reference into the final MEIR, and is on file (see LDR No 35-0411) and available for public review at the offices of the Land Development Review Division, 1222 First Avenue, Fifth Floor, San Diego, California 92101.

Response

will not include them here. Also my written comments to you on Route 56 will not be included here although I will be referring to them.

A brief history of Rancho Del Sol and the FUA follows.

The Mendiola family ran a fleet of Spanish galleons out of Mexico for a couple of hundred years and supplied Pueblo San Diego with arms, munitions and provisions. We are descendants through my mother Beatrice Mendiola. The "Jupiter Cannon" at Presidio Park was brought over by one of our ancestors. Therefore, the name of the street Cantinita Mendiola.

Don Cordero, a retired soldier who was garrisoned at Pueblo San Diego was the first rancher (sheep, cattle, etc.) and eventually owned most of the area. Via a Mexican land grant he acquired this land, which included Del Mar. He managed to maintain a small part of his ownership after the Bear Flag Republic. After 1846 and the Gold Rush came the McGonigles, Steimans, Hamptes, Zurchers, and others who dry farmed the land. In 1886 Old Black Mountain Road was established and became the dividing line of land ownership. Several of their descendents live locally and are active in the agriculture business. After W.W.II the Barczewski came back to San Diego from the Philippines after four years in Santa Tomas as POW's. Then came the Ikegawas (tomato growers), Collins (Evergreen Nursery) and myself (Rancho Del Sol and Nursery).

In 1962 a moratorium was created in the area. John F. Kennedy and Bobby Kennedy had the County place a moratorium on all property owned by the Teamsters Union (and others), who at that time was controlled by Jimmy Hoffa, and other lands owned by the Las Vegas group including Morris Shenker, etc. All this was done to stop the development from

Response

easterly Penasquitos to Del Mar. During this time the original alignment of Route 56 was established

In 1964 the City of San Diego annexed the land and promised A-1-1 zoning. In 1971 easements were granted to the City of San Diego for the Del Mar 30" water line and the McGonigle canyon 18" sewer trunk.

In 1974 the City filed a general plan and placed a moratorium on the land, only allowing A-1-10. And denied A-1-1. Around 1982 clustered residential densities of one acre minimum size were allowed with 3 acres to be placed in an urban reserve (City Council Policy 600-29). On November, 1985 proposition A was voted in to stop Pardee Construction Company and others from further encroaching on the FUA (North-City-West, Fairbanks Village, portions of Penasquitos, etc.). The general plan scheduled the FUA to be placed into planned urbanizing by 1992 without a City-wide vote

In 1992 the City Council adopted a framework plan of which we were not notified as we were in the Northwest "horsing around", attending Gonzaga University (R. Christopher Barczewski) and starting up a horse ranch. I attended all previous meetings in 1991 and early 1992 and was assured that Density Transfer Rights (Residential Dwelling Units) would be given to those who had ownership in the "Environmental Tier". This did not take place and without our knowledge and consent, the environmental tier evolved into MSCP

The Specific History of Rancho Del Sol is as follows:

- 1975 Started looking at the Deseret Trust property
- 1979 Purchased 264 acres. The entire property was leased to the Okegawa Tomato Growers. All but the steep slopes, gullies and creek beds were being farmed. Prior to the

close of escrow over 800 migrant farm workers were camping in several areas of the land and adjacent. And a condition of the close was for their removal from the land. Although they were moved, they returned and formed several camps in the various Arroyos.

- 1982-83 Settled the land and built the compound called "Fort Apache" which included a 3 wide mobile mobile-home. Started growing trees and planting them on some of the perimeter. Farming operations continued. Executed a Parcel Map and temporarily realigned Black Mountain Road at the insistence of neighbors and Deseret Trust. Convinced the City Engineers that part of the (present day) alignment would only be temporary and was a vast improvement over the existing old Black Mountain Road. He was concerned about the S curve and prophesized vehicle accidents. These did occur over the years and there are two very serious accidents and a couple of deaths. I promised that the road would be aligned along the Del Mar Pipeline easement and this I intend to do.
- 1981 The last great El Nino took out McGonigle Reservoir. Apparently the spillway was filled by dirt causing the dam to be breached. The creek bed and banks contained the water and the fringe area did not flood. In Deer Canyon the reservoir filled up and its spillway became a 20-ft deep crevasse. A landslide occurred on Santa Monica Ridge. This was caused by benching or terracing the north slope next to the sewer main and lake. The slide is at the saddle of the ridge on the east end of Lot 1.

Great fires whipped up by Santa Ana Winds from the East have occurred in the past at a frequency of one large fire every ten years and smaller ones every five years. The two large ones that I witnessed was in late 79 and November of 1989. These Santa Ana grass and brush fires cannot be controlled once started and become wild with speeds up to 40 knots or so. Columns of flame, over fifty feet high, were common. I participated in the

PR

Response

fire fight of 89 and let me tell you, it was frightening. watching fire trucks racing away from it at 35 mph on the agriculture roads. We commandeered two D-8 bulldozers and dozed brush and fire breaks wherever we could. The Ukegawa dozers and crew appeared to the East of Fort Apache and cleared large areas of brush and weeds. Zurcher dispatched his dozer and large discs to Lot 31 and created large firebreaks around the Mayslock property and Lot 31. We went up Santa Monica Ridge and dozed what we could and was forced back down the ridge road. Fortunately 20 acres of Lot 1 was previously disced and ready for farming. The fire jumped up Santa Monica Ridge east of Lot 1 Deer Canyon. Cordero ridge and canyon exploded into a very large high intensity fire and continued west at high speed incinerating every thing in sight. The fire was totally out of control burning through the night. The next day the Santa Ana winds came back and whipped it up and headed at high speed to Palacio Del Mar. Helicopters with five-hundred gallon buckets ferried water from the Deer Canyon reservoir. The fire was finally stopped at Palacio Del Mar. At the time, everyone thought that it would burn through to the ocean. I have videos of this episode.

This October or next we expect a big one (1998 or 1999). We have had the big rains and therefore grass, weeds and brush will be quite overgrown and ready to fuel a much larger fire than the fires of 79 and 89. This time we have a large problem. The Deer Canyon reservoir is gone. Where will the helicopters get water for the next Santa Ana fire fight? Fortunately, I installed two fire hydrants at the toe of Santa Monica ridge at both ends of Lot 1 and all the way up Camino de Mendeta and Rancho Santa Fe Farms road to Black Mountain. We have disced all areas possible. Zurcher and Ukegawas farming operation has taken care of all the land surrounding the Rancho Del Sol PRD. Unfortunately, not much has been disced between Santa Monica Ridge and Del Mar Mesa. Due to the situation, I foresee a very high fire risk for Del Mar Mesa. We only have us of this

Response

writing less than four months to prepare and make repairs to the reservoir or create a new one. There are several residential developments that are in danger.

- April of 1985 filed an application for DPA. I proposed an alternative development project employing alternative architecture for commercial, condos, apartments and estate residential. I employed Cal Poly School of Architecture, Rocky Mountain Institute, and others. Created computer models, and made determinations of our microclimate. Obtained year around climate data and ran computer simulations to prove the feasibility of the various Zero Energy structures that we had designed. Identified microclimate and southwest facing slopes to be a major energy resource for stand alone heating and cooling. Identified the southwest facing slopes of Santa Monica Ridge as being the most prime followed by Cordero Ridge and McDonigle Canyon (Lot 31 and most of the lots in Rancho Del Sol Estates). Specific architecture and models for Lot 1 and Lot 31 were developed and constructed. My project was transit oriented employing water conservation and recycling, alternative landscaping and grading. This application is on file with the City and is a very serious demonstration development proposal. It has been on hold since 1985 as a result of Proposition A. The application only proposed a demonstration project on about 30 acres. Of the 264-acre parcel on where Rancho Del Sol Nursery is presently located. A mix of commercial, condos, apartments, office buildings, and single family structures was to be constructed and demonstrated to the City and State.
- October 1986 City approval of the revised Rancho Del Sol Subdivision tentative map and Planned Residential Development. EIR completed and certified.
- July, 1987 Established Rancho Del Sol Nursery.
- July, 1989 Sold Parcel 2 (40 acres) to Cindy Kasai.

PR

Response

- October, 1989 Recorded Rancho Del Sol Subdivision map 12477 and PRD. Initiated development. Sold 29 PRD lots to Duriso, Inc. Retained Lots 1 and 31 of the PRD. CC & R's established. HOA named Rancho Glens Estates
- July, 1993 Expanded Rancho Del Sol Nursery into a full fledged nursery with lucre greenhouse, etc., etc
- 1996 Revised planning as a result of Route 56. Boundary dispute with Rancho Lakes
- 1998 Deer Canyon reservoir-dam collapsed. Planning revisions for additional Route 56 alignments. Pardee's phase shift proposal and impacts to Rancho Del Sol. Responded to Route 56 Draft EIR's. Assessment of impacts to Rancho Del Sol due to Route 56 and Pardee Construction Company's proposed phase shift plans.

General Comments

I am appalled at what is being proposed by this ill-fated Master EIR. In my opinion, it is promulgating violation of the U.S. Constitution, the State of California Constitution, various County and City Ordinances, municipal code, City Council policies, the general plan and even the general concept of the Future Urbanizing Area. Over the years, the City has managed to whittle away at rights of property owners, particularly small property owners with limited resources. Limiting their freedom by overlaying layers of adopted plans such as the FUA General Plan, the adopted framework plan and lately, the City's adoption of the "MSCP" and establishment of "MHPA" preserve boundaries. The latter has become a great concern to myself as it has to many others. The taking of farmland and converting it to habitat has caused a massive problem in the area surrounding Rancho Del Sol, a very high probability of reoccurrence of Santa Ana Wind wild fires such as that that occurred in 1979 and 1989. I predict a similar fire this year or next year (October through December). Therefore, the MSCP/MHPA plans' concept is not only a taking of land but is endangering

the health, safety and welfare of our rural community and endangering private property. Smoking cigarettes is safer than being in the MHPA. I am an environmentalist, but only to the extent that private property rights, agriculture/ farming rights, health, safety and the welfare of others are not violated.

Now that I have got this of my chest let us cut to the chase.

323 | The City of San Diego has failed to notify Sandra L. Barczewski, Trustee (UDT 1984), Zero Energy Systems, Inc. and Robert D. Barczewski, Trustee (UDT 1977) - Landowners, of

a. City Council hearing on the Framework Plan
b. MSCP/ MHPA
c. Pardee's phase shift application of 1994 (we were thrown in it and not notified).
d. Pardee's deals with the City

In 1991 and early 1992 I attended all the workshops concerning the FUA and the environmental tier. The City staff assured me that there would be density transfers and preservation of agricultural land. It would be similar to Marin and Sonoma county. This has vanished. Thinking that this was the plan and that we would be appropriately compensated for "the take" we went to the Northwest to establish a horse ranch and to attend Gonzaga University (R. Christopher Barczewski). As a result we did not receive notices so that we could defend our land and land values.

324 2 No where is there even a mention of the Rancho Del Sol Subdivision and it's PRD. Please refer to the attached maps. This was recorded on October 18, 1989 along with a certified EIR. As such, the MEIR is flawed and is violating City Ordinances and Municipal code. The negative open space easement grants to the State and the City does

Response

323 Notification for the public hearings on the Framework Plan, the MSCP, and proposed phase shifts was done according to local and state requirements.

324 The title of the approved Rancho del Sol subdivision and PRD is acknowledged. However, throughout the MEIR and Subarea Plan the subdivision is referred to as the project name of "Rancho Cielo Estates." Please see Figure 2-3. Figure 2-5 identifies the parcel as the Barczewski Subdivision and also shows the Zero Energy System parcel. The remainder of this comment regarding the prohibited public access to various open space easements is acknowledged.

not allow any public access (trails, etc.). Rancho Cielito Estates is the name of the Home Owners Association. The PRD and open space easements are off limits to the public.

325 I There is no mention of my General Plan Amendment application of April, 1985 which was put off calendar as a result of the enactment of Proposition A, a few months later. My proposal for the Zero Energy Project still stands. Even with my limited resources, we spent over $350,000 in this endeavor. Sometimes I relate myself to John Reardon in Ayn Rand's "Atlas Shrugged". As a result of Prop A I then modified the approved tentative map and finally executed the existing subdivision map and PRD in order to pay off the mortgages.

326 For Years we have identified the need for some commercial and mixed use on the northern property. This has been our input to Latitude 33 Planning, the City and especially during the 1991 workshops. The northern land is adjacent to the County estate lot development area and we consider ourselves to be in the sphere of the San Dieguito Planning area. They have been already identified the need in the area for office buildings, some commercial and mixed use. Our land is the only thing around that would fulfill this need. This would be somewhat similar to the Rancho Santa Fe Village except for the alternative architecture, EOC and indigenous landscaping.

327 Of great value is my discovery of the southeast facing slopes of Santa Monica Ridge, Cordero Ridge and Lot 31. Can you fathom the value of a residential or commercial structure that heats and cools itself without gas or electricity, year round for a hundred years or so? This was validated by the Cal Poly School of Architecture using models and microclimate data in their computer simulation studies. Results of these computer runs were presented to the City of San Diego with my GPA application. This has to do with mitigating global warming. The MHPA proposal would foreclose this tremendous asset.

9

Response

325. The status and history of the referenced General Plan Amendment application of April 1985 is acknowledged.

326. These comments regarding the preferred land use designations for the ownership are acknowledged.

327. Comment acknowledged.

By the way, I was a consultant to the National Center for Atmospheric Research (Boulder) and the Desert Research Institute (Reno) during the period 1967 through 1972 I worked for Drs. Telford, Squires and Kellog (NCAR) who were then conducting flights through hurricanes and thunderheads with various kinds of aircraft and attempting to model the earth's atmosphere in their computer programs and powerful computers. Dr. Kellog is the Chief person who identified Global Warming. My job at the time was to apply very sensitive instrumentation and classified space, missile and avionics systems and data to their flying laboratories. I learned much from these talented gentlemen and applied this knowledge to alternative approaches to residential and commercial structures and began the search for land that would accommodate zero energy structures. Rancho Del Sol was it. Several years later I raised enough money to purchase the land in 1979 After constructing a passive solar house, with other alternative features, in Palos Verdes Estates and living in it for a few years, I moved the family back to San Diego. "Lock, Stock and Barrel" I quit the Aerospace Corporation, terminated my consulting business, custom home building company, sold out my land holdings in Palos Verdes Estates, two restaurants and a commercial fishing boat and settled on the land. I designed a 3 wide mobile home, had it constructed and installed a wind/ solar power station (independent of SDG&E) to power the house. This became my real time living laboratory for the next two years. During this time I performed independent research and measurements and

328 formulated the Zero Energy Project and alternative transit oriented community. The City then was interested in stopping any development in the FUA. All my efforts "went to hell in a hand basket" as a result. No one in City Hall listened or was interested. They were too engrossed in stopping development. The end result became the existing PRD which by the way was the first. The only person in opposition was Pardee Construction Company due to their land holdings to the North, East and West. In order to mitigate the influence that they had with City Staff I had to sue the City to eliminate the unfair and

Response:

328 Comment acknowledged. The Zero Energy Project parcel (305-021-16) is identified on Figure 2-5 of the EIR.

costly conditions that were placed on the Rancho Del Sol Subdivision. Other first in the HCA are (1)Certified EIR, (2) Fish and Game Permit, (3) State of California Coastal Commission Permit. I will never forget the time when the Fish and Game warden came out to give me my permits. She said that I was the first to ever apply for one before the fact. She told me stories about incidents with Pardee and others, including the City- more or less indicating to me that there had been an ongoing battle and infractions. Mind you, this was in 1986. Subsequent to this time, there have been other major incidents. No wonder that the City and Pardee are experiencing major problems with F&G and Coastal. What bothers me is that citizens such as ourselves are paying for the sins of the past. There definitely exists a polarization between the governmental agencies.

329 After Prop A and approval of my last tentative map and PRD (1986) it was suggested by various planners (City included) to offer the property to Pardee or to have Pardee pay for the cancelation of the PRD. Pardee declined. Several times we have proposed to Pardee boundary adjustments and land swaps- Again they declined. A month ago I made another attempt on the East boundary. Again they declined

330 ↓ Proposed MHPA - Please refer to my correspondence of 3/1998 to the City Attorney's Office, 3/1998 to Pardee and Latitude 33, 3/1998 to the Planning Commission.

Of the 156 acres in the Barczewski Family Trust, 146 acres or 93.6% of our land is proposed for contribution to the MHPA. This is not acceptable and will not be allowed for various reasons. Please refer to the Rancho Del Sol Map

↓ The 6.5 acre parcel (2 tax assessor parcels) to the east of the PRD is developed and zoned A 1-10. The finger canyon or gully was filled with compacted dirt and contains a 18-inch commercial sewer line and public utility easement. On the east boundary

17

Response

329 Comment acknowledged.

330. See response 322 above. In addition, this position on the application of the MHPA to the subject property is noted.

there is a 1,000-ft long Negative Farming open space easement. We are farming this parcel and have planted ornamental trees, shrubs and ground cover (mother stock) for the nursery. We are also using it for soil mixing and will be utilizing it for our thoroughbred horse breeding stock. Both of Pardee's plans show this as part of the MHPA when in fact the MHPA and the MSCP show this property developed and not part of the MSCP. 4.5 acres are affected. None of this property is in the coastal zone.

331 b Lot 31, 10.3 acres, is in the PRD boundary and is currently zoned A-1-10. 2 acres of it are overland with a negative biological easement granted to the City of San Diego. It is not in the coastal zone. Except for the Biological easement it has been extensively farmed and graded. In the past there have been several fires and much of the gentler slopes have been bulldozed for fire breaks. It contains an 8-inch water line and 8 inch sewer. Planning of this property is for high density residential at the top and estate residential at the bottom. The estate residential of 7 one-plus acre lots can be accomplished (A-1-1) and would become a part of the PRD. It has access (60 ft strip of land) to the private street. Currently, no public access is allowed (PRD boundary and Negative biological easement). For all practical purposes this lot is developed and is mitigated. Certified EIR. Both the steep slopes and gentle slopes are southeast facing and are therefore a major resource as they will accommodate the zero energy structures as proposed by the CPA proposal of 1985. The RPO fails to incorporate this or identify southeast facing slopes as a resource and must be included

332 for posterity. There exists a non-building area easement which was requested by the City (for Pardee) in 1986. I granted the easements with the understanding that all NBA and slope easements be extinguished once the primary arterial road situation is established. There are several lots in the PRD that are affected (Lots 12 through 17 and 19 through 21). Since all Pardee phase shift proposals identify the prime arterial location north of the PRD there is now no need for these NBA easements except

Response

331 b These comments on the status of Lot 31 are acknowledged.

332 These comments on the status of Lot 31 are acknowledged.

possibly for a west ingress/ egress for the PRD. I will initiate exonerations of these MHA easements in the near future.

333 I would like to mention that public trails through the Lee Living Trust parcel is not a good idea. First, it is to be a biological preserve (gnat catcher, etc.). Second, it is a major breeding ground of the Mojave Green Rattlesnake (very plentiful- several hundred kills over the years that I know of). Now I have been told that the U.S. Marine Corp. bred these snakes during WWII for the purpose of dropping them on the Japanese held pacific islands. There is no mention of this snake in your EIRS. They are highly poisonous. Please research the origin of these snakes. If they are indigenous to the Mojave Desert, what are they doing here? It appears that they should be destroyed for the purpose of public safety and for the buds, particularly for the gnat catcher.

334 On another note, there is a small agricultural pond at the center and is a watering hole for coyotes, bobcat, etc. A few years back I sighted a black panther in this area. I ventured in several times (armed) both day and night. There was a large colony of pack rats and several hopping rodents that looked like miniature kangaroos (kangaroo rats). The black panther looked very old and apparently was living off the rodents and cottontails. It shied away. Local folks told me that this cat was someone's pet that got away many years ago. Haven't seen him since. Your EIR did not mention the Road Runner. They are fairly plentiful and appear to breed in Lux property canyon. There have been many sightings in the PRD. I haven't seen any in the East McGonigle Canyon area. I was told by one of our nursery employees that in Mexico they are a delicacy and cross bred to chickens in fencing to me that the residents of "Rancho Diablo", the migrant camp, consumed them. A week later he called me over and proudly showed me a caged Road Runner. I brought him a frozen chicken the

Response

333 According to the project biologist, the Mojave green rattlesnake referred to as the commonly is likely to be the southern Pacific rattlesnake (subspecies of western rattlesnake) which is very similar in its appearance. The Mojave green rattlesnake is restricted to the deserts of California, Arizona, and Nevada, and the deserts and mountains of mainland Mexico. It is not found in the coastal areas of California. The southern Pacific rattlesnake is not considered a sensitive species.

334. The referenced species were not observed during the biology surveys of the project site. The biology surveys of the project site were conducted by Natural Resource Consultants during 1996 and 1997. A biology technical report documenting the results of the surveys is an appendix to the MEIR. Table 4C-2 in the MEIR indicates that while the greater roadrunner was not observed during the survey, it is a species which could occur on the subject property. The reference to the peregrine falcon (a MSCP-covered species) is acknowledged, but this species was not observed during the biological surveys.

next day in trade for the bird and had him let it go. Later I told him to breed and eat rabbits (Conejo) instead. I gave them a hutch and a breeding pair in exchange for the promise of not to trap Road Runners.

Peregrine falcons (a couple of breeding pairs) have been sighted directly above the Nursery. I have seen them hunt this arroyo. Also, several other birds of prey including barn owls.

335-c Lot 1, 29 acres is zoned A-1-10 and is a part of the PRD. Equestrian lots are planned for the future (reference CC & R's for Rancho Glens Estates. It has two sewers (8" and 10"). Two 8" water lines and two fire hydrants. In 1981, during the last El Nino, the McGonigle canyon dam (agricultural Reservoir) breached and at the same time a landslide occurred at Santa Monica Ridge on the east end of this parcel. Over the years, dirt from remnants of the 17-ft dam and the landslide were spread out and tilled into the soil during farming operations. Also, export dirt from Rancho Glens was placed and spread. Except for 6.5 acres, all of Lot 1 is above the 100 year flood line. Negative farming open space G delineates the 100-year flood plain. A 48-inch RCP (storm drain) exists north of Lot 1 at the street and empties out through Lot 1 to McGonigle Creek. The 18 inch sewer trunk traverses this parcel. The fire hydrants are at each end of the parcel and were installed for the purpose of combating future fires. The parcel is fenced and gated at three places. Trespassers have ripped out the gates several times. A creek crossing is maintained for police, fire trucks and city maintenance vehicles. This is not a permanent crossing and one needs to be constructed. The State of California Coastal Commission issued me authorization and permit to channel the remnants of the reservoir. This has not been done and will be needed in the future. The Rancho Del Sol certified EIR describes the hydrology and the flood plain, based upon the 1983 topographic survey that I had flown.

14

Response

335 These comments regarding the history of Lot 1 of the PRD are noted.

336 Pardee's flood plain analysis (Latitude 33) is suspect. To the northeast they are preparing mass grading and modifying the natural drainage channels and as a result will be concentrating runoff towards Lot 1, Lot 2 and Lot 3. We are also concerned about concentrated runoff in Subarea IV and of course, Rancho Penasquitos. Now, the McGonigle Rivers air that was excavated in the 40's still exists. It must be returned to its natural state and channeled. Keep in mind that the 18-inch sewer trunk is next to this fake bed. Therefore remedial work must be done. Page 106 of the MEIR states that no flood control structures or features are proposed in the future for the creek systems in Subarea III. Has there been a combined hydrology/ runoff analysis of the combined effects of Pardee's property development plan NE of Rancho Del Sol, Subarea IV and Penasquitos? I believe that some of this has been done and that flood control features will be required to mitigate the runoff created by up stream development. Pardee's proposal is not acceptable.

I have provided comment- Written and oral. I have met with their planners and engineers and put them on notice. The drainage basins are in the Coastal Zone. Permits will be required from the State of California to restore the land east of Rancho Del Sol to channel runoff.

337 Lot 1 (20 acres) is currently under cultivation for hay and grass. I will be bringing my thoroughbred horses (brood mares, foals and yearlings) to this specific location as planned. Lot 1 will stay A-1-10 for the immediate future, while we transition ourselves from Spokane to San Diego. This will take at least one year. Adjacent to Lot F, above the toe of Santa Monica Ridge is a dedicated equestrian trail. This easement was granted to the city as a condition of the Subdivision map. There are no other trail easements granted. This 10-ft trail easement must be graded

15

Responses

336. The MEIR and Subarea Plan indicate the general location of detention basins which may be necessary to accommodate runoff from the project site. As the more future development proposals are brought forward, detailed drainage studies and appropriate hydrology/water quality measures would be required to the satisfaction of the City Engineer.

337 Comment acknowledged.

I have no intention of contributing any of the land to the MHPA. In fact, a cursory review of the MSCP plan that I reviewed at the Carmel Valley shows this area and others as not in the MSCP and was in a developed state

338 We will be demanding that McGonigle Valley/ Canyon be continuously fenced to the east and west as it has been since the Bear Flag Republic and possibly during Spanish Rule. This will be our insurance regarding fire control. Also dirt roads for fire trucks, etc. must be established and maintained. Under no circumstances should revegetation take place. There exists a slide next to and on the Pardee property. Again, this occurred in 1981 and appears on my 1983 topo

339d Remainder Parcel 4, Ex. Map 12477, 113 acres. Pardee proposes to place this in the MHPA. This will remain A-1-10. This is not acceptable and I have no intention of even contributing any of the land to the MHPA. This will remain A-1-10 with no public access. Except for the southeast slopes of Santa Monica Ridge all of it is in the Coastal zone. A certified EIR for this property was completed and approved in 1989 by the City and State. A substantial amount of Negative Biological and Farming open space easements were granted to the State and to the City in accord with the EIR and conditions of the Subdivision Map 12477. All landforms and biological sensitive areas are permanently protected and without any cost to the citizens of San Diego. I still have the burden of property taxes and the maintenance of these preserves. These preserves are consistent with the goal of the MHPA.

340 In a detailed review of your last DEIR for Route 56 I noticed that the MSCP boundaries left out parts of my property that is physically located on Del Mar Mesa and abutting Mr. Goodell's subdivision (which by the way we never received notice

16

Response

338. Comment acknowledged.

339. Comment acknowledged.

340. Comment acknowledged.

from the city to Mr. Goodell. I am informed that Mr. Goodell's subdivision has been approved however. His subdivision land-locks that portion of the property abutting his

Mr. Goodell and Mr. Coopersmith has promised to make the necessary corrections prior to his transferring the proposed subdivision to the new owner

341 Pardee's proposal has fallen upon. Also, the MSCP map that I reviewed at the library shows developed areas in this 113-acre parcel. Nowhere do I see a yellow area to accommodate the Route 56 alignments that have been in existence prior to any MSCP or MHPA. This cannot be. Route 56 has been in existence before the annexation of the land into the City (1962). Annexation took place in 1964

342 The SE facing slopes of Santa Monica Ridge and Cordero Ridge are a major resource as explained before and must be in the RPO, it is just too valuable of an asset for zero energy structures

343 Another significant resource is the existence of mineral resources MRZ-2 on half of Santa Monica Ridge and Cordero Ridge. According to the MHR (pages 315-316) significant mineral deposits of MRZ-2 are present and that there is an anticipated 60 million ton deficit of PCC aggregate through 2030

These resources are extremely important to the zero energy structures as larger amounts of concrete are needed for the earth integration and the trombe-walls

Now, I have made a copy of your figure 4.J-2, mineral resource zones. Please note that the southerly alignment that I proposed(d) for Route 56 is through this resource area

17

Response

341. This comment on the history of the State Route 56 alignment and the relationship of the alignment with the establishment of the MSCP is acknowledged.

342. Comment acknowledged

343 These comments on the Central Alignment for SR-56 and mineral resources within Subarea III are acknowledged. Please see response 347 below.

Do you fathom what this means? There will be enough aggregate to help pay for Route 56. Mining operations can go on prior to completion. Therefore the Route 56 alignment in Carbon Canyon/Ridge is the most optimum and will further conserve of the shortage of this material. You must place this alignment as the most economical as well as resource oriented. I do not know how far the Carbon Ridge MRZ-2 deposits go east of SAFE. I believe, they will extend all the way. If so, than a tremendous cost savings will occur and the excavated material will alleviate the shortage predicted by 2030. In short, there will be enough base and enough concrete for Route 56! Am I missing something? Therefore, there can only be one alignment for Route 56 – That I have previously proposed in 1993, 1996 and again and again. I will be transmitting this information to all concerned and, the City had better be ready to respond and to provide a competent, nonpolitical comparative analysis. It is just too damn important. All this information is in front of your faces. Am I missing something?

344 As for farming I intend to keep on and go into grass, hay, horses, some corn, etc. There is a significant shortage of hay in California and most of it is being shipped in from Utah and Arizona. As for irrigation I intend to fire up the old well and put in a couple more. Also the permanent location of the growing grounds for Rancho Del Sol Nursery will be located on Santa Monica Ridge and other areas. Not all land is suitable - depends on the elevation.

345 The Deer Canyon reservoir is gone and is now a major source of siltation to Penasquitos Lagoon. In order to control this, around four acres of the 16-acre Biological Easement needs to be converted back to agriculture. I will be applying for this change with the Coastal Commission and I am reasonably certain that it will be granted. At its present state, it is a problem. There is an area left where water has

Response

344 Comment acknowledged

345 Comment acknowledged

	Response
pocked and large wide mouth bass are still alive. Mr. Wallace, a resident of the PRD has taken it on to himself to move the fish to another lake	
We will be expecting that the farming areas east of Rancho Del Sol will remain to protect against Santa Ana wild fires	
Please refer to the figure showing all the possible SR-56 alignments through this parcel	
346 The MSCP/MHPA has failed to provide for any of the middle proposed routes and as such is flawed the existence of Route 56 has been known since 1962. The city annexed in 1964. The FUA was created in 1974 with the 1962 alignment in place. In 1985 it was moved to the toe of Santa Monica Ridge. In 1993 I identified the Cordero Canyon alignment. In 1996, 97, and 98 I validated this alignment as the most viable and with the least environmental impact. Now, with MRZ-2 deposits this must be the route taken	346. Comment acknowledged
347 I present to you page 318 of the MEIR. This is quite interesting as it demonstrates the short sightedness of this document	347. The draft EIR concludes that the inability to mine mineral resources under the proposed projects is a significant cumulative impact. Only adoption of the No Project alternative would eliminate this potential adverse effect.
Issue: Yes it would because once in never out and the construction industry will be short, impacting the required sand, gravel and aggregate at great expense to the future residents of the area	
Impacts: There were existing mining operations in the overall area. There used to be a sand and gravel plant and ready mix plant. These are all gone as a result of the	

development of Carmel Valley - there has been no replacement. Pacific Highlands Ranch is but one area of the FUA.

Of the 116 acres of designated MRZ2 zone lands of which we are part, the deposits are identified as a source of aggregate which will be required locally. The cost of housing must be kept down! How in the world do you, the City, demand low cost housing and at the same time create a shortage of the basic materials for construction?!

Pardee's proposal of incorporating Rancho Del Sol 113 acre parcel is ludicrous and we will not allow it to happen. What has happened to common sense? Even the most prudent environmentalist would laugh at this proposal. Can you fathom the amount of pollution from the trucking in of materials, the wear and tear of our overburdened freeways and roadways, etc. and etc.

Precluding the reasonable extraction would be a travesty.

348 Consider Route 56 and its needs. The base required, the concrete required, and the excavation and grading required. The statement of significant impacts is played down. There is a history of mining activities in the FUA which have been shut down. There will be no intent on the part of Rancho Del Sol to keep this resource in perpetuity. How can the writer of this paragraph conclude that since they would be retained in perpetuity as open space areas that there would be no potential significant direct impacts (as anticipated). The person who wrote this should be summarily fired. I request an investigation of this area and further request that Mr. Frank Belock, the City Engineer be deposed as to why the Barrazewski Southerly Alignment is "fatally flawed". We are talking about millions of dollars in savings to the tax payers and

Response

348 Comment acknowledged.

future residents. I further request an economic analysis of the situation. Certainly something is not adding up and, we the property owners in the area are being kept in the dark. What is the hidden agenda?

The value to Route 56 is enormous and Cordero Canyon is pointing the way.

349 I just hope that I have not incensed anyone on the City as most of you know that I have allot of respect for it's staff. I intend to obtain a permit to initiate the partial mining of this resource without impacting the land. You all know that I have been very prudent and a good steward of the land. There is just too much at stake to allow any further restrictions. Let common sense prevail. Route 56 must go through to keep you, the City, out of State and Federal courts. All resources and efforts must be concentrated in accomplishing Route 56. Without it, Penasquitos and Carmel Valley is shut down. Also, there is a growing hostility towards the City. There are talks of "de-annexing" or "detachment" due to apparent mismanagement or failure to communicate. Before closing comments on this 113 acre parcel there are more items that are required. You must show access from the west across Pardee property to Rancho Del Sol. This must be a 60 ft. ROW so that we are not prejudiced in any way.

350 Regarding the sensitive plant species: As you know we are a commercial nursery with major facilities and talented personnel. We can in fact grow any of the sensitive plant species. Will the City of San Diego purchase them in quantities of thousands of flats? I have always been intrigued about these indigenous plants. But, is there a market? As for the remainder of this parcel, the fire of 1989 was so intense that the south side of Cordero Ridge was totally incinerated. 150+ year old barrel cactus stands were totally done in. My investigation and reconnaissance of this area established that there

Response

349 These comments on SR-56 are acknowledged.

350 Any revegetation done to establish mitigation credits within the MHPA would be accomplished pursuant to the Conceptual Revegetation Plan prepared for the draft MEIR and per a Master Revegetation Plan as part of the Subarea Plan.

had been no fires in the past 200 years. There is not much left and therefore, Cordero Canyon is quite available for Route 56.

351 Concentrated runoff from upstream development appears to have collapsed the Deer Canyon reservoir. It is now a major source of siltation. Remedial work needs to be performed and the City needs to concentrate on flood control and perform more hydrology studies.

352 This 165-acre parcel is part of the Rancho Del Sol Subdivision Tract Map 12477. Recorded 10/89. It has two 8-inch water lines to it and access to the McGonigle trunk sewer via two existing 8 and 10- inch sewers. It is landlocked and requires public street access to the west although it has prescriptive rights as a result of farming operation and existing dirt roads above and below Santa Monica Ridge. Part of the property is topographically part of Del Mar Mesa and abuts David Goodell's development.

353 Mr. Goodell's Latitude 33 and the City failed to give us notice and the benefit of the various hearings, and review of their EIR, hydrology, grading, streets, etc. Portions of this property is not even in the MSCP. I notice that the source of maps and info is Latitude 33 planning and engineering. A detailed inspection of Figure 3-4, Regional open space plan (MSCP) shows the boundary of Subarea III not including several acres of this parcel at the south.

As a result, we demand a hold on Mr. Goodell's final map until we assess the impacts to our land. I already know that his subdivision will be dumping runoff water on our property, and that they have not provided us access to the public roads. I also need to know the location of public utilities and the like. They are also planning to grade our

Response

351 See response 336 above.

352 This comment on the relationship of the subject property to another subdivision within Subarea V is acknowledged.

353. Figure 3-4 is intended to generally illustrate regional open space.

property. We understand that the approved subdivision is in the process of being sold. We need to give notice to them of our intent to provide another SR 56 alignment below Del Mar Mesa. As for the adopted framework plan we again did not receive notice nor had the opportunity to address the City Council. We did hear after the fact that the Mayor and some members of the City Council considered it unfair to the small property owners and favored Pardee, but adopted it for the lack of anything else

354 The MSCP and MHPA plan was not provided to us for review. We have not had the opportunity to review and comment. We again did not receive notice of the plans. I have heard that there is a procedure where an adjustments to the plans can be made Please provide us with the City of San Diego notice package. Three sets to

Sandra J. Barczewski, Trustee
8222 South Ramona Rd
Spokane, WA 99224

Robert D. Barczewski, Trustee
6561 Black Mountain Rd
San Diego, Ca 92130

Zero Energy Systems,
Same as above

As presented I consider the MSCP as a "land take". It is in my opinion this is a violation of the U.S. and State Constitution and may be in conflict with existing City Charter, ordinances and codes. It also appears to be an intent to take away agriculture and future development rights. It is in conflict with the General Plan, the FUA language and City Council Policy 600-24.

Response

354. The MSCP was adopted by the City Council in March 1997 and copies of the MSCP and descriptions of the boundary adjustment process are available at the City of San Diego. The public comment period for the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) ended on October 15, 1996, and therefore there are no public noticing packages available. However, the EIR/EIS (LDR No. 94-0203) is available for review at the offices of the Land Development Review Division at the address noted above.

What ever the case, we have established many acres in farming and biological preserves in accordance with 680-29. A certified EIR is on file. The remainder of the property must be considered for urban development as planned and established by the subdivision map 12477

Route fifty-six

355 The figure shows the various Route 56 alignments through Rancho Del Sol. All possible alignments go through the property. As an affected property owner with substantial knowledge of the land the most environmental sensitive is the 1993 alignment that I had proposed to Caltrans. Please refer to my letter to the Planning Commission

In 1985 the city staff and I agreed to eliminate the 1962 alignment in order to save McGonigle Canyon/ Valley and Santa Monica Ridge. We then placed it next to Deer Canyon at the toe of Santa Monica Ridge. In 1996 the City (Belock Alignment) moved it up Santa Monica Ridge. This is currently referred to as the Central Alignment. It wipes out much of Santa Monica Ridge, particularly the SE facing slopes which is a Major Resource as previously explained

The 1998 alignment alternative resulted from the demise of the Deer Canyon Reservoir and provides for a more superior alignment without affecting the Santa Monica Ridge slope. However it does present a future problem with regard to future development

Response

355 These comments on SR 56 are acknowledged.

The 1993 alignment is the most superior of all, having natural topographic barriers and substantially less environmental impacts. It does not affect any vernal pools and will be scenic. More important, it can accommodate expansion to 8-lanes or more as desired by Caltrans and the City Engineer. The recent findings (MRR info.) of the existence of significant high quality aggregate (MRZ-2) deposits (and extending to the east) makes this alignment completely and clearly superior. It will save the taxpayers of San Diego millions of dollars and will actually help the environment, promote farming and preserve farmland. The material excavated will be used by the highway and what export is left will be utilized locally.

Page 3.16 of the MRR states "Based on a total projected Portland Cement concrete (PCC) demand of 360 million tons of aggregate and assuming that all PCC quality material will be used, there is an anticipated 60 million ton deficit of PCC aggregate through 2030."

It therefore appears that to alleviate this shortage, SR 56 must go through Carmel Mountain/Del Mar Mesa/Los Penasquitos Canyon. I do not have a handle on the quantities that are involved, but based on the info given and assuming that there is a deposit 8,000 ft long, 50 feet deep along the ROW compute out to be:

350 feet width X 30' depth X 8,000 feet = 2,896,500 cubic yards or 5,793,100 tons.

This would help the shortfall by 10% and would provide future access to the deposits for the development of the various subareas. In addition, aggregate, sand, gravel and concrete processing plants can be located within a very short distance to the various developments and result in very short trucking distance which would in turn lower costs, lower emissions and therefore lessening to a small degree global warming.

Response

There will also be less need to create sand pits in areas that are classified as wetlands. Obviously, I do not know of all the facts and ramifications. However, I do know that tremendous savings will occur and that we will be keeping our own dirt etc. in "our own backyard".

Perhaps this is an answer to Mr. Frank Belock's problems. As I recall he has the problem of providing over 8 lanes of freeway. Now it appears that this is more than feasible. I am sure that all sorts of negatives will be thrown up. However, I believe the positives will greatly outweigh the negatives.

Whoever got this MRZ-2 info in the MCDR must be complemented because of the impotence to the Route 56 Dilemma. No one is happy with the other alignments. Now everyone should be happy with this one. Just think of the millions of dollars that it would save. As for mitigation, I believe that this approach is self-mitigating, except of course for the required plantings, dust control, etc.

356 Moreover, there will now be the possibility of more permanent reservoirs. Then there is the total preservation of Deer Canyon and it's water shed.

As far as the MHPA / MSCP is concerned. They are only a plan that is on shaky economic and legal ground. They are not law. They are after the fact. Route 56 alignment has existed since at least 1962. Annexation into the City took place in 1964. The General Plan and all the other adopted plans call for Route 56 to be in this southerly corridor. The MHPA and the MSCP must take a back seat or be placed on the endangered list or in the trash can. It is reaching too far.

Response

356 The MSCP is approved and adopted by the City of San Diego and is used within the City in its permit decision-making process. It is anticipated that the California Coastal Commission will review the MSCP and consider its adoption sometime in 1998.

The MHPA also endangers wildlife, private property, farmland, and farming rights. It is setting up the enormous probability of huge wild fires that endanger the lives of people and property. As I said before, I have seen two large ones in the last twenty years. Do you know that fire trucks are helpless and that the only effective means are bulldozers? Where will the dozers be when we need them? It was the farmers who supplied them when needed and where close by – farming.

I think that preserving the areas as I did is necessary but not on a wholesale basis and not at the expense of the property owners and the taxpayers. An artificial shortage of developable land had been created. Who can afford to live in the area? You promote low-cost housing and require it. There is no such thing in North County. Lastly, it is un-American. As one person said to me "Bob, I am a liberal democrat from Minnesota. I have never seen anything like this (MHPA/ MSCP)"

Needless to say, I will not participate in this ill fated phase shift application. I see no chance for its approval. I will not allow any further land takes. We have already given up at no expense to the taxpayers 50% of the land plus provided public roads, etc. We have a certified EIR. The next take will be Route 56 but we agree with the requirement for it and will be compensated.
As Concerns the MHR's proposed take of prime and semi-prime agricultural land and its incorporation into the MHPA.

3571 The write up (pages 303-313) is definitely biased towards land take. It starts of by saying that "agricultural production has a lengthy history but is not regionally significant. I attach here with my notes and markup of this section. It then goes on and states that agricultural pursuits in the area overall are diminishing and only discusses this in terms of vegetables. Next it identifies that only 136 acres are prime farmland and which are

Response

357 The draft EIR concludes that the loss of important farmlands under the proposed project is a significant direct and cumulative impact. Only adoption of the No Project alternative would eliminate this potential adverse effect.

located in McGonigle and Deer Canyon (Figure 4-F-1). It then finally admits that 14% of the Subarea have high soil ratings. It also eludes to the fact that 48% of the area is economically farmable and that most of it is being farmed. Finally it states that 52% of the soils are mainly restricted to pasture, range or recreational uses. Then it goes on to state (as required by law), "Conversion of prime agricultural land to non-agricultural land use, or impairment of the agricultural productivity of prime agricultural land is cited in the CEQA as an environmental consequence which may (or will) be deemed to be significant" (State Administrative Code, Section 15064). Also defined in the California Government Code, Section 51201, Williamson Act, LAFCO guidelines, etc., etc.

3582. This section of the MEIR fails to identify and include the horse industry in the overall area including Rancho Santa Fe, etc. Horse breeding and raising is agricultural and is huge. Did you know that we have the largest population of horses in the United States? We are breeders of thoroughbred horses. We also raise them. We also have a stable of horses of racing age. We are members of the California Thoroughbred Breeders Association and are licensed to race in the State of California, Washington and Arizona. I will be contacting the State and the various associations to inform them of what you are up to. Your plan to convert prime farmland and pasture land into habitat will not succeed. It is ludicrous and a waste of the taxpayer's money.

3583. I want to bring your attention to page 308 (my markup) entitled, "Important Farm Lands". I have drawn in the boundaries of Rancho Del Sol. All of McGonigle Valley, Deer Canyon and portions of Carmel Canyon is prime farmland. Lot 1, 20-acres, over half is prime. The same for Lot 31. The 113-acre Parcel: except for the steep slopes of Santa Monica Ridge and Carmel Ridge, all of it is prime. In addition, these Ridges contain another prime natural resource – MRZ-2. Therefore, this entire parcel is prime

Response

358. It is acknowledged that pasture land for horses is considered agricultural. Its loss is included in the draft EIR conclusion mentioned in response 357.

359. See response 357. The portion of the comment regarding preference for the Central Alignment for SR 56 is acknowledged.

Response

and cannot be incorporated into the MHPA (except for the biological preserves under protective easements)

In answer to the question posted in part 4, section 1 of the MCIR "Would implementation of the Pacific Highlands Ranch Plan result in the conversion of agricultural land to nonagricultural uses or impairment of existing agricultural land to non agricultural productivity?" I answer. Yes, The MHPA would convert it to habital and create enormous fire hazards. And then the next question, "Would implementation of the project result in the prevention of future extraction of sand and gravel and/or mineral resources?" Again, Yes, it will make it impossible

The selection of the 1991 Central Alignment for Route 56 will be conducive to the preservation of prime farmland and other natural resources. Designed properly, it would also provide the necessary access and other infrastructure to help promote its use. In addition, it would serve as a dividing line between the nine preserve area (Del Mar Mesa and Penasquitos Canyon) and the agricultural oriented area surrounding the planned urbanizing areas. Biological and wildlife areas would still be interconnected but to the extent where prime or near prime farmland is implemented

I have been actively engaged in agricultural pursuits over the years and have become very experienced in mitigating farmed areas and wildlife biological areas in the same ownership. Most of the time they go hand in hand. One does not have to foreclose the other as it is I have experienced with Poplar Gate Farm here in Spokane, WA. We have 25 acres of grass/ alfalfa bordered by areas of pine forest. The house, paddocks, pens, barns, sunroom, decks, orchards, residences are on the other 25 acres and which are bordered and interspersed with large pines and natural wild life and biological habitat. We provide water, salt licks and other grass areas (in the rockier part). The end result as

Response

my pictures and videos will validate as a farm/ranch that is teaming with wildlife and birds

For example, living on site is about four white tailed deer, occasional large coyotes, porcupine, an occasional moose, elk in certain seasons and red deer. The birds are varied and profuse as well as seasonal. Year around we have 200 covey of different varieties of quail and game, pheasant, red-headed wood peckers (next to the house as well), two breeding pair of hawks (redtail and other), magpies, etc. Birds of prey are currently nesting (about four nests)

The alfalfa field is open and fresh running water is provided year around. Large mammals come and go as they please because we do not allow total fencing of the perimeter. The adjacent owners have portions of their fields in wheat and oats. In the fall and winter hundreds of geese and duck arrive. Swallows even migrate here in the thousands. No hunting or shooting is allowed. The birds and quail integrate with the horses in the pastures and paddocks. There are also 4 barn cats and two dogs. The cats keep the rodent population under control and out of the barns and feed rooms

e. The northern parcels that are clear of the MHPA proposal are

360 I Sandra J. Barczewski, Trustee. 2 Parcels divided by dedicated 60' wide Santa Fe Farms Road totaling 28 acres net. Under intensive agricultural use continuously since the 1800's. Contains one residence and substantial nursery infrastructure and buildings. Wholesale and retail nurseries. Production of color plants, groundcover, palms, ornamental trees and shrub, the Rancho Del Sol Nursery is the only wholesale nursery left in the area. Evergreen, a retail nursery, will be moving to Oceanside

360 Comment acknowledged

2 Robert D Barczewski, 1 Parcel, 6.6 acres

In 1990 as part of the Rancho Del Sol Subdivision conditions, urban infrastructure including 10" and 8" sewer, double 8" waterlines, public street expandable to 92 feet (44 feet) with concrete curb and gutter and storm drains were constructed. 8" and 4" water main laterals, several water meters (2" and 1") are available to each of these parcels. Also fire hydrants and street lights. Extensive and beautiful landscaping was installed. Mature trees and shrubs line the streets.

The highest and best use has been identified in the past and present as neighborhood commercial and mixed use. The property is not to be sold and is for the generation of income for the benefit of Sandra Barczewski in her lifetime and the two primary beneficiaries R. Christopher and Marci Ann Barczewski and posterity. The land can be developed for income but not sold unless circumstances require.

These properties are covered and governed by certified EIR and the Rancho Del Sol Subdivision Tract Map development conditions as executed in 11/89.

761 The phase shift/GPA application of April 1985 still stands. The proposal is for the development of an alternative transit oriented village similar in architecture to Rancho Santa Fe but employing alternative architecture, grading and landscaping. Heat and water recycling and incorporation of alternative energy conservation techniques, apparatus, etc., etc. A substantial effort and resources were expended, not including the R&D effort that was accomplished in Palos Verdes.

Sandra Barczewski's parents are Edwina McDowell (deceased) and Paul McDowell both long-term residents of San Diego. Edwina was employed by the City of San

Response

361. The status and history of the referenced General Plan Amendment application of April 1985 is acknowledged.

Diego for a long period, she was the secretary for Mr. Ed Gabrielson, City Engineer and after his retirement became the first women building inspector for the City of San Diego. Paul, was the chief operating officer/ V.P. for Eagle Construction Company. Both retired and moved to North City West, purchases one of the first few houses from Pardee. Marci Ann also lives in a condo purchased from Pardee. Since their retirement, the McDowells and Gabrielsons have remained social friends.

Out of respect for the City, her parents and the Gabrielsons, Sandra Burczewski will not stand in the way of the City's crucial need for a Route 56. Therefore, although she does not like Route 56 crossing her property and destroying and impacting what we have established there, she has established a corridor on her land for this crossing. This detailed info was sent to you and I will not repeat it. She is opposed to anything further north on her property and will in fact file suit to protect her interests. All Alignment D, Modified D and Modified F, as far as she is concerned, are one and the same. The analysis we did on these crossings specifies the exact crossing/ alignment and that would be at least cost and damage. There will be mitigation for Rancho Glens Estates and this will be taking Lot 27 and 26 out of the PRD and adjusting and reconstructing the entranceway. The land could revert back to the subdivision and the original owners in turn for credit towards the land take that is necessary for the freeway. Other mitigation would be to shift the alignment 1,000 feet west before crossing into Rancho Del Sol. This, however, is assuming that a southerly/ central alignment is not politically feasible for the City at the present. Also, this assumes a four-lane plus expressway and that all future lanes would be accomplished in the south a decade or so from now. As for the other prime arterial (Carmel Valley or Del Mar Heights), we are assuming that the City Engineers (1982) successor, Mr. Frank Belock will stipulate to the realignment of existing Black Mountain Road and the removal of the "S" curve and be aligned along the parcel property lines which are

coincident with the centerline of the forty foot Del Mar Pipeline Easement, or be placed at the northern boundary and terminating at Rancho Santa Fe Farms Road. This would allow for the future 4 – 6 lane prime arterial no matter location. For some reason, Pardee will not listen or incorporate this requirement. This is specified in any subdivision map conditions. Furthermore as a condition of this "safe corridor" alignment and the identification of Carmel Valley prime arterial to be located north, we expect the immediate vacation of the temporary non-building area easements and slope easements that were imposed on the subdivision. This pertains to Lot 30, 13-18 and 19-22 of the PRD.

362 Pardee's proposal calls for peripheral Residential on the two larger parcels and, low density on the north parcel. This is not acceptable as previously explained. We are planning a village mixed use commercial on the entire property. We have provided detailed comments and documents to Latitude 33. None have been incorporated. They cited the City as the culprit. Please refer to Cathy Winterrowds letter to Latitude 33. She is providing direction to them: "Harpersweski; show framework plan land uses and corresponding zoning, do not include a second commercial core on this property, include the existing development area, show the MHPA consistent with the adopted MSCP Subarea plan." Finally she says "provide all property owners with a copy of the proposed Subarea plan for their review and comment."

363 I Since she is the project manager in the City for this Subarea, is she not responsible to insure the earliest communication of information to all affected landowners? She has not done this. All the people around were kept in the dark. The only reason I found out about this was a very late City notice. She, Pardee and Latitude 33 has purposely with held information. She shall be held accountable for this

Response

362. These comments regarding the landowner's position on the proposed land use designations for the ownership are acknowledged.

363. All noticing for the proposed project has been done in accordance with local and State requirements. The references to the "Pardee Settlement Agreement" on pages 83, 105, and 186 of the draft MEIR are taken from the City of San Diego's MSCP Subarea Plan (Item C19). This document is available for review at the offices of the Land Development Review Division at the address noted above. For information on the settlement agreement, please contact MSCP staff at the Community and Economic Development Department, 202 C Street, Fourth Floor, San Diego, California 92101.

action. We did not receive any prior notices on the other matters over the last few years.

In the MCIR, there is mention of a Pardee settlement agreement with the City. It is not provided. We all demand a copy of this agreement since it does effect all the other properties, public safety, health and welfare, etc., As well as the proposed taking of land.

364 2 "Framework plan uses and corresponding zoning" are something very new to us. We have not been noticed and have been deceived by the City of San Diego. Where are the density transfers, etc., etc.?

365 3 Do not include a second commercial core on this property. We are not asking for a commercial core. We are demanding, based upon long term planning and prior applications a village orientation to serve the greater San Dieguito planning area. We are part of it and the City does not even recognize this. We identify with the greater Rancho Santa Fe area and will continue to do so. There has always been a need for a village center for the past 20 years. There is a shortage. Therefore, we do not understand her and Pardee's problem. Again, we are the first on the block-executed subdivision, urban infrastructure, commercial infrastructure, and so on. Perhaps Cathy is too used to extreme high density and cookie-cutter homes. We must preserve what is left of our living environment and this is certainly not what is proposed by Pardee. Frankly, although Pardee serves a good purpose, they and the City have failed to recognize our past planning and development efforts. Pardee wants mass grading and manufactured slopes. We don't. Pardee wants heavy concentrations of housing and a get in and out type of construction. We

Response

364. The North City Future Urbanizing Area Framework Plan is a document for guiding the City in its achievement of community goals and objectives. The Framework Plan identifies broad goals and policy statements to be used in evaluating future planning efforts in the Future Urbanizing Area. The specific subarea plans are land use plans that, by their nature, amend the Framework Plan for the subject subareas.

365. Comments acknowledged.

don't. Pardee wants to destroy natural drainage courses. We don't. Pardee wants to place highways in the North, we don't. I can go on and on

It's been said and I am beginning to believe that Pardee has controlled the City's Planning Department for the past twenty years. I can say that I now believe this. They just go ahead and do what they want to accomplish the various developments that they are planning in all areas - in and out of the FUA. General Bull Moose has gone too far. It is now time for the city to take time to fathom the huge problems that are festering to the East (Penasquitos) and to the West (Carmel Valley). It appears to me that the city must place a 2 year moratorium on all residential construction in these two areas. We are being punished for the sins created in these two areas. Caltrans is mentioning a 2 year delay of any construction of Route 56 Central segment because if built it will cause 15 - 30 minute pile ups at Carmel Valley I-5

With the above in focus, does it not seem more sensible to create areas of commerce, etc. To offer businessmen (and women) an alternative to La Jolla Village, Downtown and even Carmel Valley. My God, we are having some problems just getting over to the Del Mar Race Track and Red Tractors Restaurant

366 4 "Include the existing development area". Well this is not acceptable. This is against the concepts of the General Plan, etc., which I will expand on later.

367 5 "Shows the MHPA consistent with the adopted MSCP Subarea Plan." This has not been done. In fact, the MHPA plan by Pardee is a forgery. They have concocted 100 year flood plains boundaries based upon their runoff (mass grading on the northeast), proposing to inundate Lot 1, 2 and 3 and other areas and then,

Response

366. Comment acknowledged

367. The City of San Diego's MSCP Subarea Plan contains provisions for Boundary Adjustments. The Boundary Adjustment that has been proposed for this project is the result of discussions among the City of San Diego, the United States Fish and Wildlife Service, the State Fish and Game Department, conservation groups, and the applicant, and does not reflect any independent actions on the part of the City's Subarea Plan Project Manager.

establishing an MHPA boundary based upon, this. What do you think of this? Is this a forgery? These are heavy accusations, but I have the proof. Will Cathy Winterrowd be able to withstand a searing deposition. Well, she had better be prepared for one. Her failure to communicate with us is not acceptable. Who does she work for? The City of Pardee? We will not mince any words when it involves anything to do with her proposed MHPA. A simple comparison with the original proposed MHPA (which we were not notified of a few years back) and the current one will show glaring differences. She is just allowing Pardee to do what it wants.

Therefore, I see no alternative but to recommend to the City that she be removed as a project manager for Subarea III. There have just been too many infractions, the main one being not being available to other affected landowners, smaller or larger, NOT Pardee.

368 On other issues, we are opposed to their circulation plans through Rancho Del Sol. NOT ACCEPTABLE. We have provided input to Pardee and Latitude 33, but to no avail.

368. Comment acknowledged.

369 There is also the elementary school location next to our heavy farming, horticulture and horse operations. This is not acceptable to us or to the Home Owner's Assoc. (PRD). Pardee has all sorts of more viable locations to the east next to their proposed open space. Also this is not a good idea regarding the PRD and the future intent of city providing a small retirement area.

369. Comment acknowledged.

370 There are proposed public trails. As mentioned before, this is not possible for reasons said. There is, however, a dedicated 10 foot equestrian trail above the toe

370. Comment acknowledged.

of Santa Monica Ridge. Give me some money and I will put it in. I also have other better ideas for the bike paths, hiking trails etc.

371 Pardee proposes to wipe out our street (WPR installation) and infrastructure. Since we only see Modified E as the only possibility for the Northern Alignment, I will not pay any attention to the other alignment proposals. We hereby demand that our street remains intact. We will not succumb to Pardee's mass grading proposal and infrastructure as they see it. They must maintain natural drainage courses and grade accordingly. We do not accept any of their proposed circulation. We will dictate to them as what is and what isn't acceptable. I have already provided substantial input.

372 Finally, I want to relate to you that for years we and others have considered the northern corner parcel known as "Bob's Corner" locally as for commercial use only. There are many, many memories with regards to the balloonists and "Nice Guys" events, etc., etc.

373 There are many flaws in the presented and colorful aerial photographs depicting the boundaries. The Coastal Zone is 550 feet off - too far north. Property boundaries are also about that much off. In short there is not anything in the MEIR that does not revision. It is a lovely, error-ridden proposal and will require substantial overhaul and newer and more objective sources of information.

Since it is now 3:05 p.m., Sunday and the deadline is tomorrow, I will close

Response

371 Comment acknowledged.

372. Comment acknowledged.

373. The Coastal Zone boundary and property ownership boundary shown in Figure 3-1 (excluded) in the MEIR to generally illustrate these features within the context of the larger subregion. More precise boundaries of each are shown in the Subarea Plan.

374 1. Please do not include any of the property that we own that is proposed to be taken over by the MHPA in this proposed phase shift. These are Lots 1, Parcel 3 to the east and 113 acres of remaining parcel 4.

375 2. Rancho Del Sol exists as a legal subdivision. It is not even mentioned anywhere in the document

376 3. Provide a reservation of 10% of all of Pardee's residential density and 10% of the proposed commercial for Rancho Del Sol

377 4. We are totally opposed to the MHPA proposal. It does not even come anywhere close to the original MSCP plan Proposal. The legal grounds for the MSCP is also quite shakey

378 5. Route 56 should probably be delayed so that we don't rush into a bad situation. Several events and discoveries have occurred as previously explained. It sure looks like the Southerly Modified Central Alignment as I proposed based upon information provided by the MCDR is the way to go. Two years seems to be the appropriate delay. A moratorium on Penasquitos and Carmel Valley should also be imposed. It appears that staff in the City must be reorganized. Probably new faces, mindsets, etc. This will be required for you to respond to some very upset residents and landowners in the area. The whole Subarea III will have to be redesigned from the very beginning for it to become a reality. So far it spells G-R-I-D-L-O-C-K.

I apologize for not having the time to edit my own writings. Therefore consider it as a rough draft. Again, I am trying to keep things in proper perspective. It is hard to do when your own neighbors are upset and have litigation against the phase shift proposal and Route 56 specific alignments.

I just hope that I have conveyed sufficiently the information on what the areas of trouble are

58

Response

374 Comment acknowledged

375. See response 324 above.

376. Comment acknowledged

377 Comment acknowledged

378 Comment acknowledged

I have seven yearling thoroughbred horses that I will be naming soon. Since I have been so engrossed in the matters concerning us I have decided to submit names to the Jockey Club as follows. Keep in mind that I own a stallion named "Dave's Reality" by his famous sire "In Reality."

1. Route Fifty six
2. Fifty six Realities
3. Phase Shift
4. Phase Shift Reality

There are two colts and five fillies all by Dave's Reality. They will be running mid July of 1999. It will be interesting to see who runs first, the horses or the developments. Hopefully we will all be relocated to San Diego by that time.

Respectfully Yours,

Robert D. Barczewski

Cc. Mayor Golding
Louis P. Goebel, Esq
Arti Pansoori, EDA
Frank Belock, City Engineer
Mrs. Beatrice Beck
Mr. & Mrs. Zuercher

PACIFIC HIGHLANDS RANCH SUBAREA III PLAN MEIR
LETTERS OF COMMENT AND RESPONSES

Letters of comment to the draft EIR were received from the following agencies, groups, and individuals. Several comment letters received during the MEIR public review period contained accepted revisions that resulted in changes to the final MEIR text. These changes to the text are indicated by strike-out (deleted) and underline (inserted) markings. The letters of comment and responses follow.

U.S. Fish & Wildlife Service
2730 Loker Avenue West
Carlsbad, CA 92008
(619) 431-9440
FAX: (619) 431-9618

CA Dept. of Fish & Game
1416 Ninth Street
PO Box 944209
Sacramento CA 94244-2090
(916) 653-9767
FAX: (916) 653-2588

May 18, 1998

Lawrence C. Monserrate
City of San Diego
Development Services Center
Land Development Review Division
1222 First Avenue, MS 501
San Diego, California 92101

RECEIVED

Draft Master Environmental Impact Report for the Pacific Highlands Ranch (Subarea III) Subarea Plan, City of San Diego (LDR No. 96-7918, SCH No. 97111077)

Dear Mr. Monserrate:

The California Department of Fish and Game and U.S. Fish and Wildlife Service (Wildlife Agencies) have reviewed the Draft Master Environmental Impact Report (DMEIR) for the Pacific Highlands Ranch (Subarea III) project in the City of San Diego and offer the following comments. Our comments are based upon information provided in the April 3, 1998, DMEIR, the Biological Resources Assessment of Subarea III (Natural Resource Consultants 1998), discussions associated with the City of San Diego's Multiple Species Conservation Program (MSCP), our knowledge of biological resources in the project area, and a project design/mitigation agreement negotiated between the City of San Diego, the Wildlife Agencies, local community planning and environmental groups, and Pardee Construction Company.

1. Subarea III of the City's Future Urbanizing Area (FUA) encompasses 2,652 acres east of Interstate 5, west of Interstate 15, and north of Del Mar Mesa. The property within Subarea III includes portions of Carmel Valley, and McGonigle and Gonzales Canyons. The proposed southern alignment alternatives for the middle segment of State Route 56 would bisect Subarea III. In addition, the site contains approximately 1,510 acres of the City's Multiple Habitat Planning Area (MHPA), the preserve planning area of the City's MSCP Subarea Plan.

The project proposes to develop residential units, a town center, schools, public facilities, and transportation networks on approximately 2,652 acres of land. The DMEIR Recognizes analyses contained in two project design alternatives. Subarea Plan 1 is designed to accommodate the SR 56 Alignment E Alternative, and Subarea Plan 2 is designed around the Alignment B Alternative. Both subarea plan alternatives propose encroachment into the MHPA in exchange

Response

PR-1

Response

for expansion of the MHPA in the Deer Canyon and Carmel Mountain areas of the City. Subarea II and I proposes to encroach 149.9 acres into the MHPA within Subarea III, while Subarea Plan 2 would encroach 214.4 acres. Both plans propose to encroach 8.3 acres into the MHPA on the Carmel Valley Neighborhood 10 property. Within Subarea III, much of the encroachment into the MHPA would impact agricultural lands (Tier IV habitat), while expansion of the MHPA on Del Mar Mesa and Carmel Mountain would involve primarily Tier I, II and III habitats. Total impacts to all habitat types within Subarea III consist of 1,115.0 acres for Subarea Plan 1 and 1,164.5 acres for Subarea Plan 2.

The Subarea III development plan proposes to mitigate in accordance with the requirements of the City's MSCP Subarea Plan, both for direct and indirect impacts. The open space design for both Subarea Plans 1 and 2 provides sufficient on-site open space to meet the mitigation requirements for the various habitat types proposed for impact. In addition, the Subarea III project proposes to compensate for impacts into the MHPA by providing biological equivalency through expansion of the MHPA elsewhere. Specifically, the MHPA would be expanded to conserve an additional 75 acres of important habitats, with 59.7 acres being in the Tier I category (southern maritime chaparral). These additional lands would come from the conveyance of lands from Carmel Valley Neighborhood 8A property and a 60 acre parcel in Deer Canyon to the City of San Diego. Biological equivalency is proposed in the DMHLR, despite the reflected net increase in acreage of MHPA encroachment versus expansion, because of the much higher biological values of the additional lands to be conserved versus those impacted (mainly agricultural lands). In addition, the acreage of habitats in Tiers I through III gained (75 acres) and lost (74.6 acres) within the MHPA are approximately equal. Pardee Construction Company is also proposing a 110-acre mitigation bank on their Subarea III property, which would sell credits for habitat restoration that is planned. In addition, the option of establishing a 20-acre mitigation bank on Carmel Valley Neighborhood 8A is proposed should this area not be acquired as a park site.

The Wildlife Agencies offer the following comments and recommendations:

General Comments

1. The assembly and success of the MHPA is dependent upon maintaining the biological integrity of the interconnected habitats within it. It is critical that corridors are acquired to ensure connectivity between habitat patches. Although encroachment into the MHPA is not encouraged, the Wildlife Agencies recognized that some adjustments, especially in areas that contain lower-quality habitat, may be necessary in limited circumstances. Our concurrence with requests for MHPA encroachment is dependent upon the City being able to make findings of biological equivalency in the project's mitigation plan. The City's MSCP Subarea Plan allows for MHPA adjustments to be made which would result in the addition of lands with equivalent or higher biological values. Our review of the Subarea III DMHLR considered the consistency of the

1. Comment noted. Figures 3-7, 3-10, 4A-7, and 4A-8 of the Final MEIR have been revised to clarify the MHPA encroachment acreage.

Response

project proposal with the City's Subarea Plan and an agreement package for allowable encroachments within the MHPA which included proposed land dedications, purchase options, mitigation banks, and constraints on brush management within certain key wildlife corridors. This agreement package is included as an attachment to this letter.

The Draft EIR for the middle segment of SR-56 has completed public review, and we have responded with our issues of concern regarding that project in our separate comment letters. In those letters we articulated our support for any of the three northern alignment alternatives and identified how the Central Alignment alternative would result in violation of the agreements for the City's MSCP Subarea Plan. The configuration and impacts of Subarea III depend upon which alignment is chosen for SR-56. Although the DEIR for SR-56 considered four alternative alignments, only development proposals for Subarea III associated with the Northern F and D alignments (Subarea Plan 2 and Plan 2) are considered in detail in the Subarea III DMEIR. Our previous discussions on the boundary equivalency determination for Subarea III with the City, Parsons, and other interested parties focused mainly upon the Northern F Alignment (Subarea Plan 1) because the proposed impacts under the Northern D Alignment (Plan 2) were more severe. For example, the total loss of MHPA lands within Subarea III for Subarea Plan 1 is approximately 350 acres, whereas the loss of MHPA lands under Subarea Plan 2 is approximately 420 acres. We have concerns that the proposed encroachments into the MHPA in areas 8 and 9, into the wildlife corridors in McGonigle and Gonzales Canyons, under Subarea Plan 2 is too great. The placement of residential housing in these areas creates not only significant direct impacts, but also all of the indirect impacts associated with residential development. These indirect impacts to already constrained corridors are likely to be significant as well. The placement of urban development north of the SR-56 alignment in the vicinity of western McGonigle Canyon as proposed in Subarea Plan 2, reduces the direct and indirect impacts to the key habitat linkage within the MHPA, and likely reduces management costs to maintain conserved habitat lands south of the development area. We believe that Subarea Plan 2 best minimizes direct and indirect impacts to the MHPA, and we concur with the findings of biological equivalency for encroachments by this plan into the MHPA. For findings of biological equivalency to be made for Subarea Area Plan 2 there would need to be a reduction in MHPA encroachment in Areas 8 and 9, as well as a commitment to incorporate a bridge, versus a culvert, into the design of Del Mar Heights Road where it crosses Gonzales Canyon.

Specific Comments

1 As currently proposed, Subarea Plan 2 may hinder movement of animals between Gonzales and Deer-McGonigle Canyons because of the close proximity of SR-56 and Del Mar Heights Road in concert with culvert undercrossing. The distance between Del Mar Heights Road and the Northern D alignment is only 900 feet (versus 4,000 feet for Subarea Plan 1). For wildlife to traverse two corridor choke points and the associated noise and lights from two major road systems, within such a short distance may reduce the

effectiveness of the Gonzales Canyon corridor. In addition, staff has found that animals using an underpass should have an unobstructed view of the habitat on both sides. We believe that the Subarea Plan 2 alternative may not provide an unobstructed view and could constrain safe passage of wildlife. Therefore, the corridor's long-term biological viability could be reduced, resulting in a loss of habitat connectivity and an increase in the number of roadkills.

2

3 The DSMEIR indicates that the wildlife under-crossing for Del Mar Heights Road where it crosses Gonzales Canyon will be a culvert (e.g., page 102, last paragraph). It is our understanding that a bridge was to be constructed at this location, not a culvert. MSCP Subarea Plan documents indicate that bridges are to be used in this area to facilitate wildlife movement (guideline D12, also see DMEIR page 106, paragraph 1). Please revise the DMEIR to require that a bridge crossing be constructed at this site. The bridge should be designed consistent with MSCP standards (e.g., 2:1 length-to-width ratio). Appropriate fencing to direct under and around bridges, as well as fencing to direct wildlife away from the roadway, should also be incorporated into the Final MEIR. Maintenance of bridges should be consistent with the MSCP guidelines that suggest wildlife corridor crossings

4 should be kept free of trash and debris which may preclude wildlife use. We suggest that the mitigation measures in the MEIR explicitly reflect these guidelines. The incorporation of the above measures would reduce impacts to the Gonzales Canyon wildlife corridor and make the project consistent with the City's MSCP Subarea Plan.

5 7 Figure 3.9. The multi-use trail path of the western portion of SR56 should abut the southern edge of SR-56, consistent with the public access, trails, and recreation section in the City's Subarea Plan (p. 54).

6 3 Pages 52-54, Camino Santa Fe Road. Consistent with the City's Subarea Plan, we recommend that Camino Santa Fe Road, south of the Northern F Alignment of SR-56 or south of the Subarea III boundary, be eliminated. This road would impact wildlife crossings at McGonigle and Deer Canyon.

7 4 Page 57, Anticipated Future Projects. All future projects should be designed and built consistent with the City's Subarea Plan. For example, land use adjacency guidelines should be followed, revegetated or landscaped areas should use only native species local to San Diego County, and the MSCP general planning policies and design guidelines should be adhered to.

8 5 Pages 6-7, Future Discretionary Actions. The U.S. Fish and Wildlife Service cannot accept these lands, as these lands are not within an approved national wildlife refuge.

6 The Wildlife Agencies will work with Parties on developing mitigation land banks.

Response

2. Comment noted.

3. Bridges will be located where SR-56 crosses McGonigle/Deer Canyon and where Del Mar Heights Road and SR-56 cross the north-south corridor that connects McGonigle Canyon and Gonzales Canyon. Culverts will be used at other locations along both Del Mar Heights Road and SR-56 in cross canyons that are not located in the MHPA. Figures 3-3 and 5-4 of the Subarea Plan show bridge and culvert locations for both Alignment "D" and "F" Crossing of Gonzales Canyon as shown in the MSCP Subarea Plan is not planned. Figures 3-18 and 3-19 have been revised to show the location of bridges and culverts.

4. Natural areas that are disturbed during bridge construction will be revegetated in accordance with the Master Revegetation Plan. As these areas are within the MHPA, they will eventually be dedicated to the City who is responsible for long-term maintenance.

5. Comment noted. However, the location of the trails in the southwestern portion of the Subarea west of Camino Santa Fe have been designed to utilize existing roads and easement locations to reduce impacts on native vegetation.

6. As addressed in the draft MEIR, a bridge would be provided on Camino Santa Fe Road south of SR-56 to allow east-west wildlife movement within the MSCP corridor along the southern boundary of the subarea. Camino Santa Fe provides access to Subarea V. The elimination of Camino Santa Fe from the City's Circulation Element would require that the City Council direct that an amendment be initiated, studied, and heard in a public hearing. Such action is a separate project and is not part of the proposed project.

7. Comment noted. As described in the Land Use section (Issue 5) of the draft MEIR, the project would comply with the MSCP directives and priorities.

8. Comment noted. Ownership of the referenced land will be transferred to the United States Government or other agency as directed by the City of San Diego. In this case, the land would most likely be conveyed to the City of San Diego and become part of the MHPA.

9 however, these agreements won't be dealt with in the future. The Final MEIR should indicate, at least in a general way, where the proposed 100-acre mitigation bank will be located within Subarea III. We are concerned about the potential for converting non-native grasslands to another habitat type for mitigation credit. There may be circumstances where conversion of habitat lands may be a net biological gain in the MHPA, but in general mitigation credit would be confined to disturbed lands that are revegetated. Also, please clarify at what point in the restoration process mitigation credits would become available to sell. We would want to see significant progress in habitat restoration before credits are approved for sale.

10

11 We generally concur with the Conceptual Revegetation Plan in the DMEIR. We request the opportunity to review the Master Revegetation Plan for Subarea III and the mitigation bank lands before the plan is initiated. The development and implementation of the Master Revegetation Plan should be considered and coordinated with revegetation plans for SR-56 and FTA Subarea IV. In addition, salvage of the four MSCP covered species that would be impacted by the Subarea III project (Del Mar manzanita, coast barrel cactus, San Diego golden star, and wart-stemmed ceanothus) should be integrated with and incorporated into the revegetation plan.

12 The timing of conveyance of Pardee Construction Company mitigation lands on Carmel Valley Neighborhood 8A (Parcels A and B) to the City should be indicated in the MEIR. We recommend that conveyance occur on or before the approval of Pardee's first vesting tentative map on Subarea III.

13 It is our understanding that one element of the MHPA biological equivalency package plan was a decrease in the development footprint on Pardee-owned Carmel Valley Neighborhood 8C, such that development would be removed from the escarpment. This will not changed in the DMEIR, but should be clearly indicated in the Final MEIR.

14 Page 82 C11. The delineation and type of fencing or barriers should be fully described in the DMEIR, or the Final MEIR should require such future development within Subarea III to discuss this issue in detail.

15 Page 97, Figures 4A-3,8, Page 101, paragraph 3, Attachment Table C-2 Brush Management. It is our understanding that brush management would not occur within MHPA encroachment areas 5, 6, 7, and 8. All zones of brush management would occur within the development footprint or manufactured slopes in these constructed portion of the wildlife corridors in Subarea III. The DMEIR only indicates "No brush management activities would be performed within the preserve along the edges of several of the proposed encroachment areas." The Final MEIR should specifically indicate that encroachment areas 5, 6, 7, and 8 will not include brush management within the MHPA.

Response

9. The establishment of the mitigation bank will, upon approval by the City, become part of an overall agreement between the City and Pardee that established functional equivalency. It is the intent that the mitigation bank agreements will be completed prior to dedication of any land within Neighborhood 8A.

10 Land to be restored is generally located in McGonigle Canyon and at the small north-south canyon that connects McGonigle to Gonzales Canyon, and is mapped as disturbed/agricultural. It is intended that credits will be sold when the revegetation effort has satisfied the success criteria as the Master Revegetation Plan, probably two to five years after initial planting.

11 Comment noted. These recommendations will be incorporated into the Master Revegetation Plan as appropriate.

12. It is anticipated that the mitigation land within Neighborhood 8A will be conveyed with recordation of the first final map of which mitigation bank agreements are approved for Subarea III and Neighborhood 8A.

13. Pardee is processing a reduced development alternative for Neighborhood 8C which, if the phase shift is approved, will become effective and eliminate development on the mesa top area of Neighborhood 8C.

14. The C14 statement on page 82 of the draft MEIR is a direct reference to fencing and barrier requirements established by the MSCP Subarea Plan. In the impacts discussion under Land Use Issue 5, the Final MEIR has been revised to require that each development within Subarea III address the dimensions and type of fencing or barrier located along either side of the north/south trending canyon that connects McGonigle Canyon to Gonzales Canyon.

15 The Final MEIR has been revised to indicate those locations where all brush management zones would be located outside the MHPA. This area is generally described as being on either side of Gonzales Canyon from Del Mar Highlands east to the Burns property, then down either side of the north-south canyon that connects Gonzales to McGonigle Canyon. A second area where brush management zones are located outside of the MHPA is along the south edge of Area 5.

16 In addition, all transition slopes (approximately 20.5 acres) should be restored to native habitat. The revegetation plan requirements outlined in Exhibit I of the City's Implementing Agreement (e.g., removal of exotics, appropriate site conditions, development of a restoration plan, acquiring surety bonds) should be fully incorporated.

17 1. Page 101. The MSCP assumes a no net loss of wetlands policy; that, wetland habitat should be conserved through avoidance, or mitigated to ensure no net loss of functions and values. Mitigation for wetland impacts should be consistent with the City's Subarea Plan, and the U.S. Army Corps of Engineers 404 permitting and Department of Fish and Game's Streambed Alteration Agreement (1600) processes.

18 2. Page 113. Area specific management directives must also provide specific measures to protect against detrimental edge effects (e.g., *Myotis californicus*, Orange-throated whiptail, etc.).

19 3. Pages 183-184. Some plant species (e.g., *Quercus dumosus*, *Adolphia californica*) that may be impacted are considered regionally sensitive, but are not covered under MSCP. Following CEQA guidelines, the loss of land supporting species eligible for listing is considered significant. Plant species found on Figure 3B and 4 of the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (1994) are considered to be such species. The Wildlife Agencies, therefore, recommend that impacts to regionally sensitive plants not covered by MSCP should be mitigated. To offset project impacts and facilitate site reclamation of impacted or disturbed areas within or adjacent to the MHPA, we suggest salvaging and/or transplanting the above species to onsite open space. Appendix A of the City's Subarea Plan requires revegetation efforts restore certain species (e.g., *Ceanothus verrucosus*) within appropriate habitat. Consistent with the City's Subarea Plan, we recommend that disturbed areas adjacent to MHPA be revegetated or landscaped only with native species local to San Diego County.

20 4. Page 181. Jennings creek: Were phase 1 or 2 surveys conducted in Subarea III for the Quino checkerspot butterfly (*Euphydryas editha quino*)? Please include an assessment of the potential for occurrence of this federally-endangered species on Subarea III.

21 5. It should be noted that the proposed 5.9 acres of additional impact into the MHPA proposed on Carmel Valley Neighborhood 10 is removing habitats that were considered mitigation for previous impacts from the Neighborhood 10 development. Therefore, when assessing overall impacts, an additional 8.1 acres of Tier II and III habitats should be included for a total of 16.2 acres, to compensate for the loss of this mitigation land. It appears that, even with this additional impact, there is still sufficient conservation of habitats on Subarea III to meet the project's mitigation obligation.

Response

16 Comment noted. All transition slopes will be revegetated with appropriate vegetation types in accordance with the Master Revegetation Plan.

17. Comment noted. Any impacted wetlands would be mitigated in accordance with no net loss policies and any other applicable land use documents.

18 Area specific management directives are addressed in the Habitat Management Plan which will be implemented by the City.

19. Impacts to sensitive plants were identified and mitigation is provided through conveyance of land into the MHPA. The conveyed land supports vegetation where such plants are generally found.

20. Surveys for Quino checkerspot butterfly were conducted by Natural Resource Associates throughout the entire "fly period" as specified in the Quino checkerspot field protocols. Results were negative and a report documenting the survey results has been included as an appendix to the Final MEIR.

21. Comment noted. The text of the MEIR has been revised to show that 16.2 acres of Tier II and III mitigation will be provided for the anticipated development area within Neighborhood 10.

22 16 We concur with Mitigation Items 1 through 5 listed on page 198 of the DMEIR.

17 Page 209. The DMEIR indicates that one option for long-term management of the MHPA lands within Subarea III is the deeding over of these lands to the San Dieguito River Park Joint Powers Authority. If this option is pursued, the City needs to retain some oversight on the management activities on these lands because no MSCP incidental take permits depend upon appropriate management activities being conducted in the MHPA. Should the San Dieguito River Park JPA not manage the lands consistent with the City's MSCP Subarea Plan the City's permits could be jeopardized.

In summary, the Wildlife Agencies concur that the boundary equivalency determination for Subarea Plan 1 is appropriate and consistent with the City's MSCP Subarea Plan. However, at this time we do not concur that the boundary equivalency determination for Subarea Plan 2 is consistent with the MSCP because of the close proximity of roads, greater impacts to the MHPA, and poor preserve design. The Wildlife Agencies appreciate the opportunity to comment on this DMEIR. If you have any questions, please contact Bill Tippets of the California Department of Fish and Game at (619) 467-4215 or Nancy Gilbert of the U.S. Fish and Wildlife Service at (760) 431-9440.

Sincerely,

Carl J. Presley
MSCP Program Manager
California Department of Fish and Game

Sheryl L. Pierpont
Assistant Field Supervisor
U.S. Fish and Wildlife Service

Attachment

cc California Department of Fish and Game

Mr. Ken Kempf
Sacramento

Mr. Bill Tippets
Mr. David Zoutendyk
San Diego

Response

22. Comment noted.

23. Comment noted.

Response

PR-8

UNITED STATES MARINE CORPS

11103 27
AQ/Pacific-10
4 May 1998

RECEIVED
MAY 07 1998

CITY OF SAN DIEGO
LAND DEVELOPMENT REVIEW DIVISION
ATTN ELIZABETH TOWER
1222 FIRST AVENUE MS 501
SAN DIEGO CA 92101

RE: NORTH CITY FUTURE URBANIZING AREA (SUBAREA III) PACIFIC HIGHLANDS RANCH DRAFT MASTER ENVIRONMENTAL IMPACT REPORT EDR NO. 96-7918-SCH NO. 97111077 OF APRIL 14, 1998

Dear Ms Tower

This is in response to the Draft Master Environmental Impact Report for the Pacific Highlands Ranch development which addresses construction of residential housing within Sub Area III of the North City Future Urbanizing Area. Pursuant to the Defense Base Closure and Realignment Act of 1990, Marine Corps Air Station (MCAS) El Toro and Marine Corps Air Facility Tustin will close by July 1999 and continue to transition to Miramar. Miramar will now accommodate both fixed and rotary-wing aircraft.

The proposed project will be affected by operations of military aircraft transiting to and from MCAS Miramar. The location will be affected by the Julian and Ground Controlled
24 Approach (GCA) Box Pattern Flight Corridors for fixed-wing operations. We recommend the analysis discuss the GCA Box Pattern projections for fixed wing operations within the area.

25 Occupants will both see and hear military fixed and rotary-wing aircraft routinely and experience varying degrees of noise and vibration. We are recommending full disclosure of noise and visual impacts to all initial and subsequent purchasers, lessees, and other potential occupants. Additional information on the impacts can be obtained within the
26 Final Environmental Impact Statement for MCAS Miramar. Please modify the date of
27 this reference from May, 10 to read February, 1996 on page 420. Lastly, we are requesting a full copy of all technical appendices for retention in our files and any future Tentative or Final Map submittals for the proposed developments contained within this Area.

Response

34 Comment noted. The General Controlled Approach (GCA) Box Pattern flight corridor according to the 1996 Final EIR for the Realignment of NAS Miramar is east of the project area and fixed wing aircraft utilizing the GCA Box pattern would not pass over Subarea III.

25. Comment noted. The Final MEIR has been revised to include a disclosure statement under the Impacts section of Chapter 4K.

26 The Final MEIR has been revised to show February as the correct date.

27. Comment noted. The technical appendices have been sent to Col. Laura Thurlow of your staff.

Thank you for the opportunity to review this land use proposal. If we may be of any further assistance, please contact Ms. C. Laura Thornton at (714) 726-4707.

Sincerely,

L.A. REITBERGER III
Colonel, U.S. Marine Corps
Community Plans and Liaison Officer
By direction of the Commander

Response

DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS
SAN DIEGO FIELD OFFICE
16885 ALAMO BERNARDO RD. SUITE 210
SAN DIEGO, CALIFORNIA 92127

May 27, 1998

Office of the Chief
Regulatory Branch

Pardee Construction Company
c/o City of San Diego
Development Services
Land Development Review Division
Attn: Ms. Eileen Lower
2232 First Avenue, Mail Station 501
San Diego, California 92101

Dear Ms. Lower:

We have reviewed the "Notice of Preparation of Draft Master Environmental Impact Report (DEIR), Pacific Highlands Ranch (Subarea III) Subarea Plan in the North City Future Urbanizing Area (NCFUA)." For our project, the applicant, Pardee Construction Company, plans to develop 4,454 residential units with potential increases up to 5,456 units dependent on the result for school facilities and concomitant redesignation of school site to residential areas. A Town Center with commercial, park, open space, residential and civic area components, elementary, junior high, and high schools, a police substation, and associated public facilities and transportation network on approximately 230 acres. Pacific Highlands Ranch (Subarea III) is located in the City and County of San Diego, California.

28 The 1998 draft EIR states that our activity may require a U.S. Army Corps of Engineers permit. A Corps of Engineers permit is required for the discharge of dredged or fill material into, including any redeposit of dredged material within, "waters of the United States" and adjacent wetlands pursuant to Section 404 of the Clean Water Act of 1972. Examples include, but are not limited to,

1. Placing fills for residential, commercial development, placing berm protection, including temporary stockpiling of excavated material, building road crossings, backfilling for utility line crossings and constructing outfall structures, dams, levees, groins, weirs, or other structures.

2. Mechanized land clearing, grading, which involves filling low areas or land leveling, ditching, channelizing and other excavation activities that would have the effect of destroying or degrading waters of the United States.

3. Allowing runoff or overflow from a contained land or water disposal area to re-enter a water of the United States.

4. Placing pilings when such placement has or would have the effect of a discharge of fill material.

Response

28. Comment noted. The draft MHPR indicates that 404 permits would be required as future approvals as development proposals are processed in the future.

Response

Enclosed you will find a permit application form and a pamphlet that describes our regulatory program. Please include this letter in the DEIR. If you have any questions, please contact me at (619) 674-5386. Please refer to this letter and SP-20202-D2 in your reply.

Sincerely,

David A. Zoutendyk
Project Manager
Regulatory Branch

Enclosures

Response

State of California

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

May 19, 1998

[illegible]

[illegible]

Subject: [illegible]

[illegible] Clearinghouse has submitted the above named draft Environmental Impact [illegible] to selected state agencies for review. The review period is now closed and [illegible] the enclosed comments from the responding agency (ies). On the enclosed Notice of Completion form you will note that the Clearinghouse has checked the agencies that have commented. Please review the Notice of Completion to ensure that your comment package is complete. If the comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number [illegible] in your letter as may be required promptly.

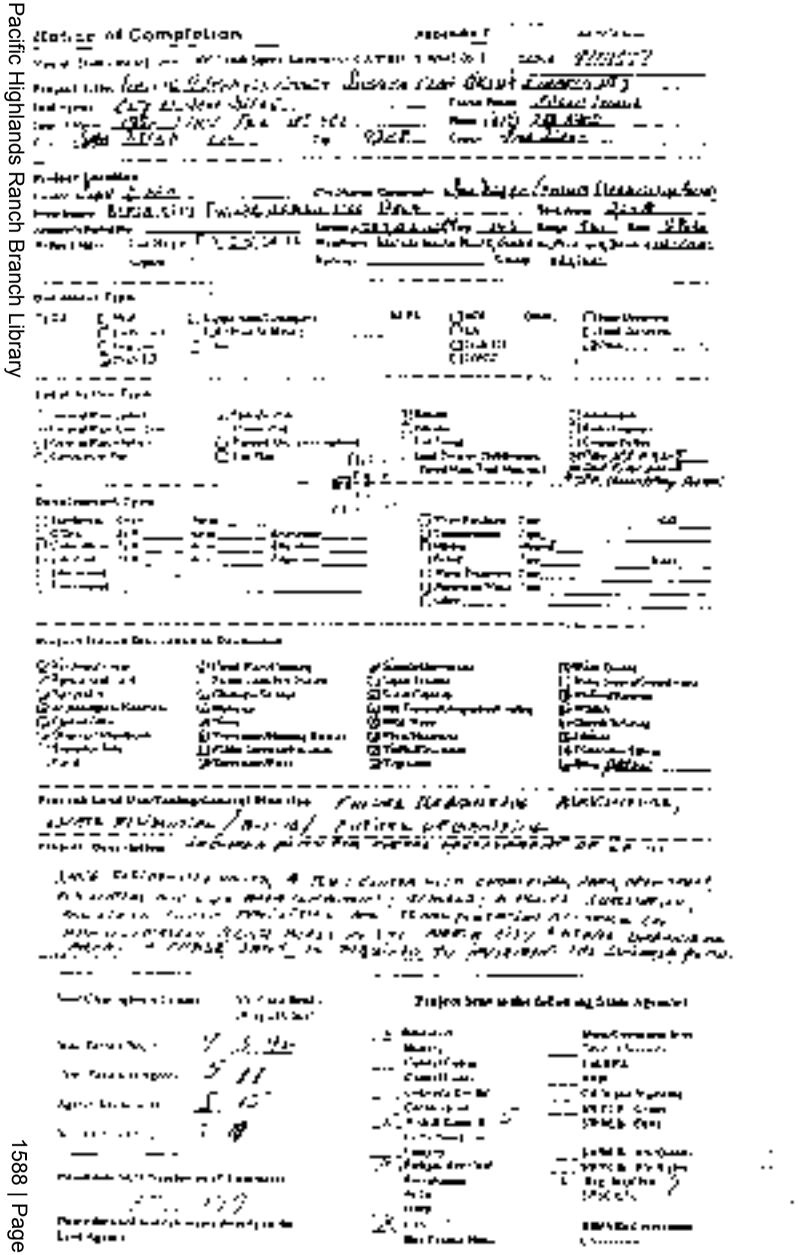
Should you have any further questions regarding this environmental review, please do not hesitate to contact the State Clearinghouse.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact at (916) [illegible] if you have any questions regarding the environmental review process.

Sincerely,

Antero A. Rivasplata
Chief, State Clearinghouse

Enclosures
cc: Resources Agency


Notice of Completion

Response

STATE OF CALIFORNIA — PETE WILSON, Governor

GOVERNOR'S OFFICE OF EMERGENCY SERVICES
DISASTER ASSISTANCE PROGRAMS BRANCH
Hazard Mitigation Section
Post Office Box 419023
Sacramento, California 95741-9023
Phone: (916) 464-3914
Fax: (916) 464-3919

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APR 1 x 1998
RECON

April 17, 1998

RECEIVED
APR 23 1998

Eileen Lower, Environmental Planner
City of San Diego, Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Dear Ms Lower

SUBJECT: DRAFT MASTER ENVIRONMENTAL IMPACT REPORT (DMEIR)
NORTH CITY FUTURE URBANIZING AREA
PACIFIC HIGHLANDS RANCH SUBAREA

The Governor's Office of Emergency Services (OES) appreciates the opportunity to comment on the City's DMEIR. As you know, flood, fire and seismic disasters in California over the past 20 years have cost the federal taxpayer and the people of the State billions of dollars. Clearly, to mitigate these losses, the best opportunity is during the planning stages of our built environments.

29 To this end, we suggest that the risk of flood, fire and seismic hazards be clearly identified and
30 evaluated as well as the standards to which these risks will be mitigated. Further, we suggest that specific hazard mitigation plans be used to guide development of the La Zanja and Gonzales Canyons in the San Dieguito Hydrographic Unit and McGonigle and Deer Canyons in the Penasquitos Hydrographic Unit.

The following documents may be helpful in developing ordinances and plans:

FLOOD HAZARD MITIGATION PLAN (OES) November 1996
HAZARD MITIGATION OPPORTUNITIES FOR CALIFORNIA (The State/Federal Hazard Mitigation Survey Team Report) October 1997
CALIFORNIA AT RISK, REDUCING EARTHQUAKE HAZARDS (Seismic Safety Commission) September 1992
CALIFORNIA FIRE PLAN, A FRAMEWORK for MINIMIZING COSTS and LOSSES from WILDLAND FIRES (California Board of Forestry) March 1996

Response

29 A discussion of flood hazards and appropriate mitigation measures are included in Chapter 4 D, Hydrology; and seismic hazards and mitigation measures are included in Chapter 4 H, Geology, of the draft MEIR. With respect to fire hazards, future development proposals would be required to comply with the brush management regulations of the city of San Diego.

30 The Pacific Highlands Ranch Subarea Plan does not entail development of McGonigle, La Zanja, Gonzales, and Deer Canyons. These areas would be preserved as natural open space in the MSCP open space preserve.

Response

If you have any questions or comments, please contact me at (916) 464-1014, or Kim Bryant, Hazard Mitigation Program, at (916) 464-1099.

Sincerely,

JOHN ROWDEN
Program Manager

c: The Governor's Office of Planning and Research

Paula Schutz, State Hazard Mitigation Officer

DEPARTMENT OF PARKS AND RECREATION

RECEIVED

1 1993

Response

31. The finding of functional equivalency has been made by the City and concurred with by the State Department of Fish and Game and the US Fish and Wildlife Service per the requirements of the MSCP and Implementing Agreement. The rationale for the necessary finding is discussed in the Land Use section of this MEIR. See also the letter of comment from the Department of Fish and Game and the USFWS on the draft MEIR.

32. The additional 22-24 units within Neighborhood 10 are not located within the MHPA.

33. Land proposed to be on the mitigation bank is located within the MHPA and is now mapped as "Other/Agricultural."

34. Section 1.4.1 of the already approved City of San Diego MSCP Subarea Plan already allows such uses and includes measures to ensure they are properly located to minimize impacts.

35. As described in the draft MEIR, the City of San Diego, subject to concurrence with the U.S. Fish and Wildlife Service, is responsible for making this determination.

36. The referenced paragraphs at page 98 paragraph 14, page 99 paragraph 1, and page 104 paragraphs 2 and 8 contain a discussion regarding the boundary adjustment of the MHPA in the City's MSCP Subarea. The referenced paragraphs are not intended to and do not address provision of mitigation for potential impacts created by the project. The proposed boundary adjustment which includes relinquishment of private development rights upon Parcels A and B in Neighborhood 8A, will occur if a successful phase shift is approved by the voters in November of 1998.

37. See response 31 above.

38. The City of San Diego is responsible for monitoring and enforcing MHPA planning policies and guidelines.

39. The prioritization of the management directives was already established in the City of San Diego MSCP Subarea Plan. There is no proposal to change the directives. This MEIR addresses how the proposed project responds to the already approved management directives.

40. [illegible]

41. [illegible]

42. [illegible]

43. [illegible]

[illegible]

Sincerely,

[signature]

Edward Sexton
Superintendent

cc: [illegible]

Response

40. Comment noted.

41. Comment noted.

42. As tentative maps are processed within Subarea III, conditions of approval will require that Best Management Practices for the control of sediment be implemented to minimize impacts to Los Peñasquitos Lagoon.

43. Comment noted. The Subarea Plan requires that stormwater detention facilities will be implemented with the approval of tentative maps.

Response

State of California — The Resources Agency

MEMORANDUM

TO: Project Coordinator, Resources Agency — Date: May 15, 1998

Ms. Eileen Lower
City of San Diego, Developmental Services
Land Redevelopment Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

RECEIVED

From: Department of Conservation
Office of Governmental and Environmental Relations

Subject: Draft Master Environmental Impact Report for the Pacific Highlands Ranch (Subarea III) Subarea Plan (NCFUA) - SCH# 97111077

The Department of Conservation (Department) and the State Mining and Geology Board (Board) have reviewed the Pacific Highlands Ranch Subarea Plan. The Board designates areas having mineral resources of regional and statewide economic significance. The Department works closely with the Board to establish State policy for the conservation and development of mineral resources. The Mineral Classification and Designation process was established to ensure, through appropriate lead agency policies and procedures, that mineral deposits of regional significance are available when needed. The Department offers the following comments.

The project proposes future development of up to 5,456 residential units; a town center with commercial, park, open space, and civic area components, and the associated public facilities and transportation network on 2,652 acres in the North City Future Urbanizing Area. A portion of the proposed development is within areas designated by the Board as Sector J(5) of the Western San Diego County Production-Consumption (P-C) Region. Sector J(5) is described in the Division of Mines and Geology Special Report 153, *Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region*. According to this 1982 report, Western San Diego County has a permitted aggregate supply that will last only 32 years, and the P-C Region will face a shortfall of aggregate reserves of about 330 million tons by the year 2030 (50 year time frame of report).

Public Resources Code Sections 2762 and 2763 describe the responsibilities of the lead agency prior to its making a decision involving areas designated as being of regional or neral significance. A lead agency shall determine and demonstrate that its decisions are in accordance with the lead agency's mineral resource management policies and shall also weigh balancing mineral values against alternative land uses

consider the importance of these minerals to their market region as a whole and not just their importance to the lead agency's area of jurisdiction.

44 The DEIR is not clear whether the City of San Diego has determined and demonstrated that the proposed development is in accordance with the established mineral resource management policies of the City. California Code of Regulations (CCR) Section 3675 defines incompatible land use with respect to Mineral Resources Management Policies. The lead agency must demonstrate how this proposed project integrates with its own mineral resources management policies contained in its general plan and with CCR 3675. The mineral resource amounts discussed in the DEIR refer to mapped resources, but not to be permitted reserves. It is these permitted reserves upon which the P-C Region will depend for its aggregate needs. The Department recommends that the Final EIR include information regarding how the proposed project integrates with City's mineral resource management policies.

The Department appreciates the opportunity to comment on the DEIR. For further clarification and assistance with this issue, you may wish to contact John G. Parrish, Executive Officer, State Mining and Geology Board at (916) 322-1082. If I can be of any assistance, contact me at (916) 445-8733.

Jason Marshall
Assistant Director

cc: John Parrish, State Mining and Geology Board

Response

44 The City's mineral resource management policies are contained in the "City of San Diego Progress Guide and General Plan" goals for protecting major mineral deposits against encroachment by land uses which would make their extraction undesirable or impossible, and extraction of resources with mineral harm and disturbance to adjacent persons and properties. There is currently no zoning classification designed to protect present or future construction material resources. Mineral extraction is allowed only through approval of a Conditional Use Permit (CUP). The MRZ-2 zones (as defined by the California Department of Conservation, Division of Mines and Geology 1982) are those areas containing the mineral resources where issuance of CUPs (or permitted resources) would be appropriate. The approximately 116 acres of designated MRZ-2 zone lands on the subarea are located in areas that are proposed to be open space within the Multiple Species Conservation Program (MSCP) areas of the project. The goal of protecting the mineral resources would be met so that no substantial permanent structures would be built on these areas. However, it is acknowledged that mineral extraction is considered an incompatible use within the areas proposed for conservation through the City's MSCP, and it is unlikely that these areas would be available as permitted resources in the foreseeable future. Therefore, the MEIR identifies a significant unmitigated cumulative effect.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 11, P.O. BOX 85406, SAN DIEGO, CA 92186-5406
PHONE (619) 688-[illegible]
TDD (619) 688-[illegible]

May 13, 1998

11-SD-056
P.M. 3.0 (KP [illegible])

5/18/98

Ms. [illegible] Bebsky
State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

Dear Ms. Bebsky:

Draft Master EIR for Pacific Highlands Ranch Subarea III - SCH 97111077

Caltrans District 11 comments are as follows:

45 • All Caltrans signalized intersections should be analyzed with the intersecting lane vehicle (ILV) method per Topic 406 of the Highway Design Manual.

46 • The City of San Diego is currently preparing an Environmental Impact Report (EIR) for the middle portion of State Route 56 (SR-56). Four alternatives are being evaluated: Central, Northern, Modified Northern - D, and Modified Northern - F. Upon review of the Draft Subarea Plan, it appears that all four alternatives directly affect this Subarea. Because a preferred alternative for SR 56 has not been determined, equal consideration should be given within the Subarea Plan. It appears from the documents that a preference is given to the Northern Modified D and F alternatives. The Subarea Plan should also be consistent with any proposed interchange configurations along SR 56.

47 • Adequate noise mitigation for SR 56 may be necessary as part of the proposed community. Mitigation should be based on the ultimate configuration of SR-56 and Year 2020 traffic volumes.
48 Additional mitigation should not be required for this development when SR-56 is initially constructed or subsequently improved. Delay to the highway projects could occur if the State highway improvements were to cause a significant noise impact.

49 • Caltrans supports the concept of "fair share contributions" on the part of development toward present and future mitigation on SR-56. Specifically, we encourage construction of a left turn lane for HOV bypass at the I-5 southbound on-ramp from westbound Via de la Valle (intersection #75).

50 • SR 56 has been incorrectly labeled as State Route 66 on Exhibits 4-2, 4-3 and 4-4.

51 • The Third Interchange shown on Exhibit 4-3 should be labeled as "Possible Third Interchange".

52 • Transportation Analysis Appendix A, page 75, the future AM peak period volume of 2998 on the I-15 northbound at SR-56 ramps (intersection #63) is not deliverable. Please revise this volume.

Response

45. The traffic analysis for Subarea III was prepared in accordance with regional Congestion Management Program (CMP) guidelines and the City of San Diego Traffic Impact Study Manual. Based on both guidelines Highway Capacity Manual (HCM) analysis is the required methodology for peak hour intersection analyses.

46. The proposed project as described in the MEIR addresses Modified Northern D and Modified Northern F in Subarea Plans 1 and 2, respectively. The Central Alignment is included as a project alternative and the Northern Alignment is similar to the two modified alignments.

47. See response above.

48. Comment noted.

49. As shown on Table 20 of the traffic report, Subarea III is projected to have only 175 daily trips at the Via de la Valle/I-5 interchange. Therefore, any improvement at this interchange should not be a condition of Subarea III or require a fair share contribution because project impacts are below the level of significance threshold.

50. Comment noted.

51. The final MEIR and the traffic report will be revised to change "Third interchange" to "Possible Third Interchange."

52. The 1998 volume is the westbound through move which can be accommodated based on the HCS analysis. For the three through lanes the volume is only equivalent to about 1,000 vehicles per lane which is deliverable.

PR-21

Ms. Cindy Belsky
May 15, 1998
Page 2

53 • The ramp metering queue analysis for the I-5 southbound/Carmel Valley Road intersection (#11) should be revised to show metering of the SR-56 to I-5 southbound connectors.

54 • The impacts of substantial ramp meter queues to adjacent intersections should be discussed, including where the cars will store.

The Route Manager for SR-56 is Ed Hug at (619) 220-5433. For information regarding traffic studies, please contact Dick Coward, Traffic Operations Branch Chief, at (619) 688-4328.

Sincerely,

BILL JIGGINS, Chief
Planning Studies Branch

SS/B.S.hgn

Response

53. The queuing analysis has been revised to include SR-56 to I-5 southbound direct connector in the AM peak.

54 This discussion has been added to the traffic report.

CALIFORNIA COASTAL COMMISSION

May 28, 1998

City of San Diego
Development Services
Land Development Review Division
Attn: Robert Hunter
1222 First Avenue, MS 501
San Diego, CA 92101

Re: NCFUA Subarea III (Pacific Highlands Ranch)

Dear Ms. Lowes:

Thank you for the opportunity to comment on the Draft Master Environmental Impact Report on the above referenced project. I apologize for the lateness of these comments, but wanted to go on record with Coastal Act concerns, since an amendment to the City's Local Coastal Program (LCP) is proposed thereto to incorporate changes in the North City LCP segment (specifically in the Future Urbanizing Area). Also, coastal development permits from this agency may be required for portions of the project, depending on the timing of plan implementation. For that purpose, the following general

55 comments are offered:

The draft document includes two potential land use plans, which will be implemented depends on which alternative alignment for the middle segment of Route 56 is ultimately chosen. Only a portion of Subarea III is within the coastal area - perhaps a quarter of the subarea overall. The portion of the subarea within the coastal zone is designated similarly as open space under either plan. There are proposed to be small areas of low density, and potentially peripheral, residential developments along the northern border of the coastal zone and a designated park/school site appears to fall partially within the coastal zone as well.

56 There are several jurisdictional considerations concerning the proposed land use plan alternatives. The City of San Diego's certified Local Coastal Program (LCP) includes, among many other documents, the Sorrento City Future Urbanizing Area (NCFUA) Framework Plan, the North City LCP Land Use Plan Addendum and portions of the City's municipal code. The City issues coastal development permits for most of its geographic area within the coastal zone pursuant to the LCP. However, except for a Subarea V, which the Commission certified in March, 1997, the NCFUA represents an

Response

55 Comment noted.

56 These comments regarding the status of the various planning documents relevant to the Coastal Zone are acknowledged.

Response

area of deferred certification, meaning the planning process is not yet complete and coastal permit jurisdiction temporarily remains with the Coastal Commission. Although the certified MCFHA Framework Plan would be considered as guidance, Chapter 3 of the Coastal Act is the legal standard of review for any permit decisions made by the Coastal Commission. Further complicating matters is the status of the Multiple Species Conservation Program (MSCP). Although the City has formally adopted the MSCP and uses it extensively in its permit decision-making process, the MSCP has not been reviewed or certified by the Coastal Commission as yet. Therefore, although the Commission has supported the concept of regional conservation planning, it cannot even consider the MSCP a guidance document at this time. Again, Coastal Commission permit decisions would rely entirely on Chapter 3 of the Coastal Act.

57 Once the Commission has effectively certified a Subarea III plan, it is expected that the City would assume coastal development permit authority for the portions of the subarea in the coastal zone. Although Subarea III is east of I-5 and well removed from the coastline, any City-issued coastal permit for development within 100 feet of the top of the bank of any stream or within 100 feet of any delineated wetland (such as riparian corridors or vernal pools) would be appealable to, or by, the Coastal Commission. The various documents comprising the certified LCP would then be the standard of review for any City-issued coastal development permits. At that time, however, the plans and regulations considered by the City in its coastal permit decisions cannot include changes which are part of the City's zoning code update and associated land use plan modifications, since the updated code and related modifications have not yet been certified by the Commission and are thus not applicable in the coastal zone. This situation may have changed by the time Subarea III is submitted to the Coastal Commission for review and potential certification, since Commission staff is currently reviewing the zoning code update and related documents, which will probably be acted on by the Commission before the end of 1998.

58 In order for the Commission to certify an LCP land use plan component, the plan must be found consistent with Chapter 3 of the Coastal Act. With respect to the Commission's review of the Subarea plan, Sections 30230, 30231 and 30233 (protection of marine resources, including water quality and wetland issues), 30240 (development in or adjacent to environmentally sensitive habitats), 30250 (siting of new development in areas contiguous with existing development to minimize impacts), 30251 (protection of scenic resources) and 30253 (development in hazardous areas, such as steep slopes and floodplains) appear to be most applicable to the proposed plan. Until a specific alternative is chosen, it is not possible to say whether, or to what extent, all of these policies would apply. It is also not possible to tell from the draft EIR whether identified impacts are within or outside the coastal zone. However, based on the environmental review conducted to date, it would appear that the Resource Protection Ordinance (RPO) alternative has the least impacts overall and thus would be most readily endorsed by Commission staff.

57. Comment acknowledged.

58. The majority of the project sites within the Coastal Zone would be comprised of MHPA open space. There are also small areas of low density residential development along with the existing Rancho Cielo Estates within the Coastal Zone under both proposed Subarea Plans. In general, impacts to Coastal Zone lands are discussed in the Land Use chapter of the draft EIR under "Consistency with the Local Coastal Program." The conclusion of the draft MHPA is that both proposed plans are consistent with the intent of the North City LCP and no mitigation is required. With respect to the RPO Alternative presented in the MHPA, both this alternative and the proposed project land use plans are nearly identical with respect to development within the Coastal Zone.

59 No mention was made of the Los Penasquitos Lagoon Enhancement Fund, a water quality mitigation measure that has been in effect for many years now, and is applied to both City of San Diego and Coastal Commission permits within the lagoon watershed. It has been used over the years to fund a number of enhancement activities within the lagoon, and to open the lagoon mouth when biological conditions warrant that action. The EIR indicates that portions of the subarea drain to Carmel Valley, and thus into Los Penasquitos Lagoon. Therefore, that fee would be applicable to any coastal zone project within the Los Penasquitos watershed when individual property owners bring forward their development proposals.

60 Finally, with respect to general comments, it is unfortunate that several different documents must be consulted to get the full picture of proposed future development. The subject draft EIR references the Route 56 EIR for specific impacts of that development, even though the impacts may occur within the subject subarea. Also, the overall MSCP boundary adjustments and proposed mitigation land banks involve both Carmel Valley neighborhoods (8A and 10), and Subarea V as well as the subject Subarea III. Impacts associated with these are addressed in separate plans and/or environmental documents. Because these various plans are on separate timelines, it may be necessary to address them individually, but it makes it more difficult to understand the total ramifications of North City buildout. It should be noted that the modifications to Neighborhoods 8A and 10 and Subarea V will require certification by the Coastal Commission to be applicable within the coastal zone.

The following specific comments are also offered:

61 On Page 29, the EIR indicates that the MSCP has superseded the Framework Plan. Within the coastal zone, however, the MSCP has not been certified by the Coastal Commission and the Framework Plan is still the applicable document.

62 On Page 92, the EIR defines wetlands as any lands meeting any of three distinct criteria (vegetation, soils or hydrology), but then states that wetlands in Subarea III were identified by vegetation type alone. Might there not be wetlands occurring on site that would be defined by soils or hydrology even though wetland vegetation species are not present?

63 Tables 4C-5 and 4C-6 provide the City's anticipated mitigation ratios for impacts to biological resources; these ratios are based on the MSCP permissions and the Environmentally Sensitive Lands (ESL) regulations in the zoning code update. Since neither of these documents have been certified by the Commission, they are not applicable within the coastal zone and the ratios listed in the table are not fully consistent with historic Commission practices. Where wetland impacts have been accepted by the Coastal Commission at all it is based primarily on whether or not the project can be found

Response

59. It is acknowledged that any coastal zone project within the Los Penasquitos watershed would be subject to the Los Penasquitos Lagoon Enhancement Fund fees at the time development permits are processed. The requirement for payment of fees is contained in the City's Coastal Development Permit ordinance (Section 105.0209). Payment of the fees constitutes adherence to the law, and, as such, would not be considered "mitigation." A brief discussion of the Los Penasquitos Lagoon Enhancement Fund fee requirements has been added to the Hydrology/Water Quality section of the MEIR.

60. These comments are acknowledged. While it is true that several documents may be required for a detailed understanding of the specific impacts related to the various proposed developments in the referenced area, the Cumulative Effects section of the Pacific Highlands Ranch (Subarea III) Subarea Plan MEIR provides an overview of impacts in the area resulting from past, present, and reasonably foreseeable projects.

61. It is acknowledged that the MSCP has not yet been certified by the California Coastal Commission and the Framework Plan is still the applicable planning document for lands falling within the Coastal Zone.

62. At the time federal Section 404 Clean Water Act permits are processed for future developments within Subarea III, precise wetland delineations would be required by the U.S. Army Corps of Engineers to ensure that wetland impacts are mitigated as appropriate.

63. It is acknowledged that the MSCP has not yet been certified by the California Coastal Commission and that until such time that it is, the traditional mitigation ratios for Coastal Zone biology impacts would be enforced for development permits within the Coastal Zone.

consistent with Section 30233 of the Coastal Act), the typical ratio for riparian habitat impacts, which would include the identified impacts to southern willow scrub and mule fat scrub, has been 3:1. Impacts to freshwater marsh have been mitigated in past Commission actions at ratios as high as 4:1, although it appears no impacts to this resource are anticipated with either plan alternative.

61 That concludes staff's comments at this time, which have been based on only a limited review of the draft environmental document. Once the LCP amendment request for certification of Subarea III and possible companion LCP amendments for Subareas V and Carmel Valley Neighborhoods 8A and 10 have been submitted to this office, it is possible that other issues may be identified. If, for any reason, permit authority is not delegated to the City of San Diego upon effective certification of the Subarea III plan, future coastal development permit applications for individual site development may also raise additional issues or concerns. Again, thank you for the opportunity to comment and please call me with any questions.

Sincerely,

Ellen Lirley
Coastal Planner

cc: Lee Sherwood (City of SD)

(0553I)

Response

64 Comment noted.

County of San Diego

DEPARTMENT OF PUBLIC WORKS

May 14 1998

RECEIVED

MAY 1 1998

DEVELOPMENT SERVICES SECTION

Ms Eileen Lower
Land Development Review Division
1222 First Avenue MS 501
San Diego CA 92101

Dear Ms Lower

DRAFT MASTER ENVIRONMENTAL IMPACT REPORT FOR PACIFIC HIGHLANDS RANCH (SUBAREA III) SUBAREA IN THE NORTH CITY FUTURE URBANIZING AREA (NCFUA)

Department of Public Works (DPW) has received the above referenced document dated April 30, 1998. We have reviewed the above mentioned document and have made the following comments

The EIR and Traffic Study were prepared to document the potential impacts from the project on the Circulation Element Roads, local streets and freeways in the mid-county region. The approval of this project will be the responsibility of the City Council, however, the project is located in the F U A and thus requires a vote of the residents of the City of San Diego before the project can be taken to the council for their decision

ENVIRONMENTAL IMPACT REPORT and TRAFFIC STUDY

65 **Project Description Section** On page 52 of the report both Carmel Valley Road and Del Mar Heights Road are described as (six-lane major streets) however, figures 3-18 and 3-19 show these roads as (four-lane major streets) Please review and clarify the apparent inconsistency with these descriptions

66 **Traffic Circulation Section** Table 43-1 omits Rancho Dieguito Road from the table Rancho Dieguito Road and Rancho Santa Fe Farms Road together form the route linking Carmel Valley Road with San Dieguito Road The 24 hour volumes distributed to these

Response

65 The correct mail classification for Carmel Valley Road is a 4-lane Major and for Del Mar Heights Road is a 6-lane Primary Arterial

66 Rancho Dieguito Road has been added to Table 1, Table 12, and Table 15 of the final traffic report. Also, the LOS "C" capacity for San Dieguito Road, Via de la Valle, and Via de Santa Fe has been revised from 7,500 to 7,100 ADT. In addition, the LOS capacities for El Apago Road from San Dieguito Road to Via de Santa Fe has been revised to 9,500 ADT (LOS C) or 13,500 (LOS D) as [illegible]

residential streets from the project is potentially significant and will need to be reported in this study. The table also incorrectly states the capacity of County two-lane collector roads, the capacity at LOS ACe is 7,100 ADT instead of 7,500. The three roads that will need to be changed are San Dieguito Road, Via de la Valle and Via de Santa Fe. The capacity of El Apajo Road will greater than the standard two lane County Light Collector Road, because it is to be widened to three lanes. There will be one lane in each direction with a continuous left-turn lane between San Dieguito Road and Via de Santa Fe. The capacity at level of service (LOS) E is estimated by County engineering staff at 9,500 ADT and 13,500 at level of service (LOS) D. Table 4B-4 is also will need the same modifications made to it.

67 Existing Conditions. Table 6, Freeway Levels of Service lists the segment of I-5 between Via de la Valle and Lomas Santa Fe Drive as five-lanes and LOS A/D. This is incorrect. A field check shows the existing condition to be four lanes and LOS A/E. Please amend Table 6.

68 Trip Generation. Table 4B-8 has a typographical error in Subarea Plan I. The first entry for multi-family residential is 5001 dwelling units. A check of the traffic study shows 1,273 units for this use. These two sources need to be reconciled.

69 This table also uses an unusual trip rate for Office Uses. The SANDAG rate for this use is 20/KSF or 300/acre. The rate used in this work is 45/ac. There is some justification for raising the rate, if a large component of the total square feet office uses is medical. A medical office has a trip rate of 50/ac. However, even if 50% of the total office acreage was committed to medical uses the rate would increase to 400/ac not the 450 used in the study.

The concern over this rate is that, in the build out forecast, it overstates the probable onsite trip capture for this use by approximately 50% and in turn understates the number of off site trips distributed to the regional Circulation Element. The effect is that off site traffic impacts from the project may be also be understated. Some discussion and justification of the use of this rate needs to be included in this report.

70 Cumulative Impacts. This section needs to address the impacts of project traffic on the residential streets of Rancho Santa Fe Farms Road and Rancho Dieguono Road. The traffic volumes on these streets numbers 1500 ADT which is the Planning Capacity of these streets. The addition on nearly 4,000 ADT to those streets is a significant impact to community character and possibly the road's capacity. The study needs to establish the actual capacity of these streets using the Highway Capacity Manual procedures and to include the information in the report.

71 Table 4B-9 uses the City of San Diego standard for a two-lane Circulation Element Collector Road. The application of this standard to residential streets or County C.E.

Response

67 Table 6 of the final traffic report has been revised to show four lanes on I-5 between Via de la Valle and Lomas Santa Fe Drive and an existing LOS "E". The final MEIR reflects these changes to the final traffic report.

68 The final MEIR has been revised to reflect the comment.

69 The City of San Diego has developed and requires the use of the City of San Diego trip generation rate summary. The current City rate for commercial office use is 450 trips/acre. Therefore, the traffic analysis used the approved City of San Diego rate.

70. Not all of Rancho Santa Fe Farms Road will remain as a road light collector. Rancho Santa Fe Farms Road will be improved to two-lane collector standards from the northern project boundary to Carmel Valley Road as indicated in Table 31 (page 140). On-site streets such as portions of Rancho Santa Fe Farms Road will be improved to collector standards and separately identified in the final traffic report.

Regarding Rancho Dieguento Road and the northern section of Rancho Santa Fe Farms Road, these roadway segments currently have a posted speed limit of 40 mph. Also Rancho Dieguento Road and Rancho Santa Fe Farms Road provide a through connection for the Fairbanks Ranch community to Carmel Valley and State Route 56. In addition, the measured curb to curb is 40 feet. Therefore, based on the County of San Diego Public Road Standards, Rancho Dieguento Road and Rancho Santa Fe Farms Road are assumed to be road light collectors.

71. See responses to comments 66 and 69 above.

roads is inconsistent with the practice of using the standard of the jurisdiction in which the impact occurs. The County standard for a residential street is 1500 ADT at L.O.S. A/B and 7,120 ADT for two-lane Light Collector Roads. The capacity of residential streets may be greater that the 1,500 ADT standard. Absent specific segment analysis using the HCM determine the capacity and level of service, the additional 4,000 ADT is considered significant.

72 Intersections. The future turn volumes posted on Appendix A, for the intersection of Camino Del Norte and Bernardo Center Drive confusing. When the peak hour turn volumes for existing conditions are compared to the build out condition turns, the peak hour westbound right turns are reduced by 30% in the AM and 50% in the PM. This is an error and will need to be corrected. In addition, the title of Appendix A is confusing. The title of Appendix A is "Existing Traffic Count Summaries", yet the table shows both existing turn counts and counts labeled "Futures". There is no reference to what future project or alternative these volumes represent. Please clarify the title of this table.

73 Queuing: The EIR has no substantive discussion or analysis addressing the queuing at the ramps on I-5 and I-15. What is the impact of this project's traffic on the existing queues at Via de la Valle with I-5, also Del Mar Heights Road and Carmel Valley Road with I-5? These interchanges currently experience significant delay or some turn moves. The traffic study does present queuing information in Table 18 and a paragraph of discussion on page 94. The queue delay times for the interchanges listed in Table 18 assume that the flow rates at metered ramps will be increased to whatever rate necessary to maintain a 15 minute delay time. This assumption is unsupported and in direct conflict with the policy by which Caltrans sets meter flow rates. The flow rate for any metered ramp is determined by the capacity of the mainline freeway lanes and the volume of traffic on the mainline during the peak hours. The capacity of the mainline is finite and assuming that flow rates can be adjusted based on demand at the ramps is inconsistent known procedures. This analysis is not consistent with CEQA standards and will need to be repeated using a methodology that is consistent with the known standards and policies.

74 Freeways. The EIR report contains no analysis of the direct project or cumulative impacts on I-5, I-15 or SR-56. The Circulation Section of the EIR will need to analyze and discuss the impact of project traffic on existing conditions and cumulative conditions.

75 The project distributes 24,700 ADT to SR-56 between Carmel Country Road and I-5. This is 25% of the total project traffic and 25% of the total forecast traffic on this segment. One project using this much of the total Planned Capacity (110,000 AOT @ L.O.S. A/B) is questionable in terms of prudent land use planning. SR-56 is a regional facility, when 23% 24,700 ADT of the planned capacity is allocated to one project, a significant impact on the regional freeway capacity is created.

Response

72 Appendix A will be revised to remove the future volumes resulting in only the existing volumes being shown. Regarding the intersection of Camino del Norte and Bernardo Center Drive, the future volumes will change when new land uses and new facilities are added to an existing street system. A redistribution of traffic occurred in this area due to additional facilities and new land development projects such as 4S Ranch and Black Mountain Ranch.

73. The queuing analysis is included in Table 18 and page 94 of the traffic report which is Appendix B of the MEIR. The queuing analysis is based on City requirements and incorporates appropriate design features. Final queuing for future cumulative volumes is determined based on the assumptions that existing ramp meter rates are not changed in the future. Second, where queue lengths were excessive or do not exist presently, a 15-minute maximum queue was assumed. This provides an estimate of the possible future queues. The information in the traffic report will be manipulated into the final EIR. The procedure that Caltrans uses is based on a case-by-case approach as ramp meter systems are implemented in the various freeway corridors. When the full freeway operations and management systems is implemented, flow rates at individual meters will be adjusted on a "real time" basis (i.e., the system is a dynamic always changing system with data feedback to the operations center where computer software interprets the real-time field data and the entire system is adjusted to maximize throughput of the overall freeway system). Consequently, metering flow rates are typically not provided by Caltrans for EIR impact analysis purposes. If the county has standards, policies, and procedures for determining ramp meter queues to be consistent with CEQA standards they should be provided so that it can be determined whether a revised analysis is needed. The Caltrans comment letter above did not offer any new procedures to be used for queuing analysis.

74 The Draft MEIR includes a traffic report analysis of project impacts on I-5, I-15, and SR-56. Cumulative impacts to I-5 and I-15 are addressed in the traffic report and in Chapter 4B of the final MEIR as well.

75. It is not unusual for a project to use a significant portion of freeway capacity on a freeway segment adjacent to the interchange that primarily serves that project. The freeway system is sized to accommodate not only adjacent projects but through traffic from other projects in the general area. No jurisdiction to our knowledge has a policy for guiding land use decisions that takes into account how much traffic is put on a particular facility, particularly, a freeway. Subarea III is designed to maximize internal traffic on freeway facilities rather than arterial streets and roads for safety reasons. Cut-through impacts would be created if traffic loading to freeways was restricted by an agencies land use planning policy to do so. The state General Plan requires a balance between the land use and circulation elements of an agency's General Plan but we are not aware of any agency's land use policy that would reduce or limit external traffic on freeways from a project and deliberately increase traffic on arterial roads and streets through communities. In addition, the project will contribute to the widening of

76 The project will also add over 4000 ADT to I-5 north of Via de la Valle, the existing condition on this segment is AFH. The traffic study assumes that I-5 is between the project and SR-78 is 10 lanes with 2 HOV lanes and uses the capacity in the analysis of cumulative impacts at build out of this project. The Regional Transportation Plan (RTP) does not schedule the addition of new mainline lanes until sometime between 2011 and 2020. The HOV lanes between Del Mar Heights Road and Birmingham Drive are scheduled for construction between 2004 and 2010. The HOV capacity could be used in the analysis of cumulative impacts, but the mainline capacity will not be available until long after this projects traffic is impacting the freeway. The analysis will need to be repeated using the appropriate capacities on I-5.

77 Mitigation: The mitigation section is incomplete. It does not address the manner by which the project participates in mitigating cumulative freeway and interchange queuing impacts. The freeway impacts are an example of this omission. The EIR lists future planned but unfunded improvements to I-5 and I-15, then states that these improvements are outside the scope of project, or that the future improvements are to be made by Caltrans. There is no definition of who the authority are. This strategy is not acceptable as mitigation of either direct or cumulative impacts and will require modification to meet the standard of CEQA. The CEQA standard is, that the planned capacity on I-5 used in the analysis of cumulative impacts is currently funded or planned to be constructed in the same time frame that the project's traffic will impact I-5 and the interchanges north of the project.

If you have any questions, please call Steve Derry at (M.S. 350) 694-3727.

Very truly yours,

DOUGLAS M. ISBELL
Deputy Director

DMI:SD:KPF

Response

76. Table 11, Table 14, and Table 17 in the traffic report have been revised to show four lanes on I-5 (8-lane freeway) north of Via de la Valle.

77. Table 24 of the traffic report and the tables in the MEIR address both on- and off-site mitigation for both streets and freeways. The project is also phased with development caps until freeway ramp improvements are operational. For example, the phasing plan lists a total of only 1900 dwelling units that can be built until I-5/SR-56 ramps to and from the north are operational. Also, the funding for PR/ED preparation is guaranteed by Pardee if state or federal funds are not available in a timely manner. Fair share funding for State Route 56 widening or ramp construction is also included in the Public Facilities Financing Plan for Subarea IX.

COUNTY OF SAN DIEGO

DEPARTMENT OF PUBLIC WORKS

INTRADEPARTMENTAL CORRESPONDENCE

Department of Public Works

May 13,1998

TO: Kaylene Fleming, Environmental Management Specialist I
Environmental Services (0395)

FROM: John L. Snyder, Deputy Director
Land Development Division (0336)

SUB-AREA III (F.U.A.) CITY OF SAN DIEGO, EIR AND TRAFFIC STUDY REVIEW

I have reviewed the environmental documents submitted in support of this proposed project. The EIR and Traffic Study were prepared to document the potential impacts from the project on the Circulation Element Roads, local streets, and freeways in the mid-county region. The approval of this project will be the responsibility of the City Council, however, the project is located in the F.U.A. and thus requires a vote of the residents of the City of San Diego before the project can be taken to the council for their decision.

78 ENVIRONMENTAL IMPACT REPORT and TRAFFIC STUDY

Project Description Section: On page 52 of the report, both Carmel Valley Road and Del Mar Heights Road are described as (six-lane major streets), however, figures 3-18 and 3-19 show these roads as (four-lane major streets). Please review and clarify the apparent inconsistency with these descriptions.

Traffic Circulation Section: Table 48-1 omits Rancho Diegueno Road from the route Rancho Diegueno Road and Rancho Santa Fe Farms Road together form the route linking Carmel Valley Road with San Dieguito Road. The 24 hour volumes distributed to these residential streets from the project is potentially significant and will need to be reported in this study. The table also incorrectly states the capacity of County two-lane collector roads, the capacity at L.O.S. 'C' is 7,400 ADT instead of 7,500. The three roads that will need to be changed are San Dieguito Road, Via de la Valle, and Via de Santa Fe. The capacity of El Apajo Road will greater than the standard two lane

PR-31

Response

78 See responses to the County of San Diego Letter from Doug Isbell above (comments 65-77)

County Light Collector Road, because it is to be widened to three lanes. There will be one lane in each direction with a continuous left-turn lane between San Dieguito Road and Via de Santa Fe. The capacity at level of service "C" is estimated by County engineering staff at 9,500 ADT and 13,500 at level of service "D". Table 4B-4 also will need the same modifications made to it.

Existing Conditions: Table 6, Freeway Levels of Service lists the segment of I-5 between Via de la Valle and Lomas Santa Fe Drive as five-lanes and LOS "D". This is incorrect. a field check shows the existing condition to be four lanes and LOS "F". Please amend Table 6.

Trip Generation. Table 4B-5 has a typographical error in Subarea Plan I. The first entry for multi-family residential is 6001 dwelling units. a check of the traffic study shows 1,273 units for this use. These two sources need to be reconciled.

This table also uses an unusual trip rate for Office Uses. The SANDAG rate for this use is 20/KSF or 300/acre. the rate used in this work is 450/ac. There is some justification for using the rate, if a large component of the total square feet office uses is medical. A medical office has a trip rate of 500/ac. However, even if 50% of the total office acreage was committed to medical uses the rate would increase to 400/ac not the 450 used in the study.

The concern over this rate is that, in the build out forecast, it overstates the probable onsite trip capture for this use by approximately 50% and in turn understates the number of off site trips distributed to the regional Circulation Element. The effect is that off site traffic impacts from the project may be also be understated. Some discussion and justification of the use of this rate needs to be included in this report.

Cumulative Impacts: This section needs to address the impacts of project traffic on the residential streets at Rancho Santa Fe Farms Road and Rancho Dieguenо Road. The traffic volumes on these streets exceeds 1500 ADT which is the Planning Capacity of these streets. The addition on nearly 4,000 ADT to these streets is a significant impact to community character and possibly the road's capacity. The study needs to establish the actual capacity of these streets using the Highway Capacity Manual procedures and to include the information in the report.

Table 4B-9 uses the City of San Diego standard for a two-lane Circulation Element Collector Road. The application of this standard to residential streets or County C.E. roads is inconsistent with the practice of using the standard of the jurisdiction in which the impact occurs. The County standard for a residential street is 1500 ADT at LOS "C" and 7,100 ADT for two-lane Light Collector Roads. The capacity of residential streets may be greater that the 1,500 ADT standard. Absent specific segment analysis

Response

using the HCM determine the capacity and level of service, the additional 4,000 ADT is considered significant.

Intersections: The future turn volumes, posted in Appendix A, for the intersection of Camino Del Norte and Bernardo Center Drive are confusing. When the peak hour turn volumes for existing conditions are compared to the build out condition turns, the peak hour west bound right turns are reduced by 30% in the AM and 50% in the PM. This is an error and will need to be corrected. In addition, the title of Appendix A is confusing. The title of Appendix A is "Existing Traffic Count Summaries", yet the table shows both existing turn counts, and counts labeled "Future". There is no reference to what future project or alternative these volumes represent. Please clarify the title of this table.

Freeways: The EIR report contains no analysis of the direct project or cumulative impacts on I-5, I-15 or SR-56. The Circulation Section of the EIR will need to analyze and discuss the impact of project traffic on existing conditions and cumulative conditions.

The project distributes 24,700 ADT to SR 56 between Carmel Country Road and I-5. This is 35% of the total project traffic and 25% of the total forecast traffic on the segment. One project using this much of the total Planned Capacity (110,000 ADT @ L.O.S. "D") is questionable in terms of prudent land use planning. SR-56 is a regional freeway, when 23%, 24,700 ADT, of the planned capacity is allocated to one project, a significant impact on the regional freeway capacity is created.

The project will also add over 4000 ADT to I-5 north of Via de la Valle, the existing condition on this segment is "F". The traffic study assumes that I-5 is between the

project and SR-76 is 10 lanes with 2 HOV lanes and uses the capacity in the analysis of cumulative impacts at build out of this project. The Regional Transportation Plan (RTP) does not schedule the addition of new mainline lanes until sometime between 2011 and 2020. The HOV lanes between Del Mar Heights Road and Birmingham Drive are scheduled for construction between 2004 and 2010. The HOV capacity could be used in the analysis of cumulative impacts, but the ten-lane capacity will not be available until long after the projects traffic is impacting this freeway. The analysis will need to be repeated using the appropriate capacities on I-5.

Mitigation: The mitigation section is incomplete. It does not address the manner by which the project participates in mitigating cumulative freeway and interchange queuing impacts. The freeway impacts are an example of this omission. The EIR lists future planned but unfunded improvements to I-5 and I-15, then states that these improvements are "outside scope of project", or that the future improvements are to be made by "others". There is no definition of who the "others" are. This strategy is not acceptable as mitigation of either direct or cumulative impacts and will require modification to meet the standard of CEQA. The CEQA standard is; that the planned capacity on I-5 used in the analysis of cumulative impacts is currently funded or planned to be constructed in the same time frame that the project's traffic will impact I-5 and the interchanges north of the project.

If you have any questions, please call Steve Denny at (6.C. 550) 694-3727.

JOHN L. BAKER, Deputy Director
Department of Public Works

JLS:SD:fb

cc: Trish Boaz, District 3 (A500); Bob Christopher, DPW (0336); Robert Higgins, DPW (0336); Susan Porter, DPLU (0650); LeAnn Carmichael, DPLU (0650); Eric Gibson, DPLU (0650)

G:\LTRS\SUBAREA R

Response

BOWIE, ARNESON, WILES & GIANNONE

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[illegible]

May 18, 1998

Via Facsimile/Overnight Delivery

RECEIVED

[illegible]

City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Attn: Eileen Lower, Environmental Planner

Re: Draft Master Environmental Impact Report for the Pacific Highlands Ranch (Subarea III) Subarea Plan in the North City Future Urbanizing Area ("NCFUA") General Plan Amendment, NCFUA Framework Plan Amendment, Subarea Plan, Master Rezone, Multiple Habitat Planning Area Boundary Adjustment, and Local Coastal Plan Amendment ("Land Use Proposal")

Dear Ms. Lower:

On behalf of the Del Mar Union School District ("District"), we have reviewed the Draft Master Environmental Impact Report ("Draft MEIR") for the Pacific Highlands Ranch ("Subarea III") Subarea Plan ("Subarea Plan"). While the alignment of State Route 56 ("SR-56") must be decided before the environmental impact of the Land Use Proposal can be evaluated and resulting impacts identified and responded to, the District submits the following initial comments for consideration by the City of San Diego ("City"). The Land Use Proposal submitted to the City for development within Subarea III includes the General Plan Amendment ("GPA"), NCFUA Framework Plan Amendment, adoption of the Subarea Plan, master rezoning, a North City Local Coastal Plan Amendment, Multiple Habitat Planning Area Boundary Adjustment, Development Agreement, Multiple Species Conservation Program Amendment and conferring Third Party Beneficiary Status. The purpose of these comments is to identify the significant adverse impacts of the Land Use Proposal on the District's school facilities ("School Facilities"), and City to impose conditions of approval ("Conditions") and mitigation measures ("Mitigation Measures") to reduce such impacts to a level of insignificance. The Conditions and Mitigation

Measures need to be included in the Land Use Proposal prior to any approval by the Planning Commission ("Planning Commission") of the City.

79 Specifically, the District requests that the major real property owner ("Owner") with in the Subarea Plan area, which we understand to be Pardee Construction Company, enter into a mitigation agreement ("Mitigation Agreement") with the District prior to any consideration by the Planning Commission of the Land Use Proposal. Additionally, we propose that the Conditions and Mitigation Measures require that the remaining owners ("SP III Owners") enter into a similar Mitigation Agreement with the District prior to City approval of any legislative, discretionary residential development approval, or issuance of a building permit within Subarea
80 III, similar to the Conditions and Mitigation Measures applicable to Subarea V. The Mitigation Agreements with Owner should be included in the appendices to the Subarea Plan and the MEIR. Such Mitigation Agreement shall fully mitigate the significant impacts to be incurred by the District as set forth below. The Draft MEIR Mitigation Measure may also be revised to reflect the mitigation payment amounts that shall be paid to the District to fully mitigate the Land Use
81 Proposal's impacts on the District's School Facilities. We also respectfully request that the City extend the Draft MEIR comment period until a reasonable time after the alignment of SR-56 has been decided. This is necessary in order for the District to thoroughly evaluate the actual impacts to be sustained by the District. As it stands now, there is no specific factual setting for the general public to evaluate the Land Use Proposal, whatever in fact it is.

A. IMPACTS FROM THE LAND USE PROPOSAL

1 School Facility Impacts

(a) The Land Use Proposal will Result in Significant Environmental Impacts on School Facilities of the District

82 The Draft MEIR analyzes two (2) separate land use plans developed around the two (2) proposed northern alignments for the middle segment of SR-56, which are Subarea Plan 1 ("Subarea Plan 1") and Subarea Plan 2 ("Subarea Plan 2"). We believe this is not permissible and that these proposed routes must be deferred until the alignment of SR-56 is determined subject to the foregoing. However, we wish to advise the City that on the basis of Subarea Plan 1 incorporating the proposed SR-56 Alignment "E" and Subarea Plan 2 incorporating the proposed SR-56 Alignment "D", the following are identified as the significant adverse impacts on the District. Each Subarea Plan contains two (2) scenarios. As proposed, the first scenario for Subarea Plan 1 on the basis of SR-56 Alignment "E" proposes the development of 4,924 residential dwelling units ("DUs"), a Town Center with commercial park, park, open space, residential and civic area components; elementary, junior high, and high schools, a police

Response

79. The NCFUA Framework Plan does not require a mitigation agreement prior to Planning Commission consideration of the project. The development of the proposed on-site elementary, junior high, and high schools would accomplish mitigation of the project's direct impact to schools from the subarea plan. School facilities financing and mitigation agreements between the affected school districts and the project applicant would be required at the time the Subarea Plan is approved by the City Council to ensure that the impacts on school facilities are mitigated to a level less than significant. In addition, prior to granting a rezone or discretionary entitlement for a parcel, such parcel shall be subject to the terms of a mitigation agreement entered into by the landowner and the applicable School Districts or included in a community facilities district established by the applicable School Districts and authorized to fund the acquisition of school sites and construction of schools.

80. The NCFUA Framework Plan and CEQA do not require that a mitigation agreement be included in the Subarea Plan or final EIR. Any School District or property owner may submit an executed mitigation agreement to be included in the record of the Subarea Plan proceedings at its election.

81. The MEIR analyzes the environmental effects of the proposed subarea plans utilizing two of the proposed SR 56 alternative alignments. Additionally, the Alternatives section of the document addresses the SR-56 Central Alignment. The San Diego City Council is scheduled to review and consider the SR-56 EIR on June 30, 1998. It should be noted that while the MEIR for the proposed project can be certified prior to the selection of the SR-56 alignment, the Subarea Plan cannot be implemented until the SR 56 alignment is chosen and unless a phase shift is approved by the voters. It is not possible to extend the public review and comment period for the Pacific Highlands Ranch (Subarea III) Subarea Plan MEIR, as doing so would eliminate the possibility of placing the Subarea III Plan phase shift proposal on the November 1998 ballot.

82. See response 81 above. The remainder of this comment addressing the significance of school impacts is acknowledged.

school sites and associated public facilities and transportation networks on approximately 2,642 acres (Scenario No. 1). The second scenario has the potential to maximize the maximum number of DUs with a Subarea Plan 1 (a 5,456 DU school) if the private high school site, junior high school and one of the elementary school sites be redesignated for residential uses (Scenario No. 2). As for Subarea Plan 2, the Plan is for 4,933 new residential DUs (Scenario No. 3). A maximum of 5,414 DUs should the private high school site, junior high school and one of the elementary school sites be redesignated for residential uses (Scenario No. 4). Additionally, according to the Draft MEIR Project Alternatives - SR-56 Central Alignment Alternative, the maximum number of residential DUs that may be built in Subarea II is 5,500 (Scenario 5 - Scenario Nos. 1 and 4, as well as the other alternatives are not discussed herein because the number of DUs that may be built under Scenario Nos. 1, 2 and 5 are greater.

According to the Draft MEIR, using Scenario No. 1, the Land Use Proposal will result in approximately 1,313 new multi-family attached (MFA) DUs and 3,341 new single-family detached (SFD) DUs for a total of 4,954 DUs. (Draft MEIR, page 341.) The student generation rates ("SGR") for the school districts, as stated in the Draft MEIR, that would serve Subarea II under Scenario No. 1 would result in 1,291 grade K through 6 students ("Project Students") (1,313 MFA DUs x .472 MFA SGR = 524 Project Students) + (3,341 SFD DUs x .318 SFD SGR = 474 Project Students) = 1,291 Total Project Students). This number is incorrect because the wrong SGRs were used.

83 As to the District, the number of elementary students generated is based upon a SGR of .472 for grades K through 6 for Land Use for multi-MFA DU. Therefore the correct number of grade K through 6 Project Students generated under Scenario No. 1, using the District's SGR, will be 1,313 (1,313 MFA DUs x .146 MFA SGR = 192 Project Students) + (3,341 SFD DUs x .472 SFD SGR = 1,576 Project Students) = 1,768 Total Project Students).

The Draft MEIR, on pg. Scenario No. 2, states that the largest number of DUs that may be built in Subarea II is 5,456. Under this scenario, the Land Use Proposal will result in approximately 2,751 new SFD DUs and 2,693 new MFA DUs.[1] The number of grade K through 6 Project Students generated under this scenario will be 1,294 (2,693 MFA DUs x .146 MFA SGR = 393 Project Students) + (2,751 SFD DUs x .472 SFD SGR = 1,304 Project Students) = 1,704 Total Project Students).

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[1] Table 4D-1 of the Draft MEIR on page 344 states that the SGR for MFA DUs is .472 and the SGR for SFD DUs is .146. The reverse is true.

[2] The District has assumed that 51% of the housing product types are SFD DUs and 49% are MFA DUs for all of the scenarios discussed herein.

Response

83. The Draft MEIR has been revised to show the correct student generation rates and the associated student generation for the Del Mar School District and the Solana Beach School District. Under proposed Subarea Plan 1, a total of 877 elementary school students would be generated for the Del Mar School District and 415 elementary school students would be generated for the Solana Beach School District. Under Subarea Plan 2, a total of 1,169 elementary school students would be generated for the Del Mar School District and 564 elementary students would be generated for the Solana Beach School District.

84 Of the 4,974 DUs in Scenario No. 1, approximately 3,034 DUs (1,547 SFD DUs and 1,487 MFA DUs) would be within the boundaries of the District, with the remaining 1,940 DUs located within the boundaries of the Solana Beach Elementary School District[1]. Of the 5,456 DUs in Scenario No. 2, approximately 3,328 DUs (1,697 SFD DUs and 1,631 MFA DUs) would be within the District's boundaries, with the remaining 2,128 DUs within the boundaries of the Solana Beach Elementary School District. If the maximum number of DUs that may be built is 5,809 under Scenario 3, approximately 3,546 DUs (1,727 SFD DUs and 1,819 MFA DUs) would be within the boundaries of the District and the remaining 2,263 DUs would be within the boundaries of the Solana Beach Elementary School District.

85 The District estimates the impact on the School Facilities of the District caused by new development to be $11,206 per SFD DU and $3,514 per MFA DU.

86 The total Land Use Proposal impact on the District's School Facilities is as follows:

$22,561,000 [(1,547 SFD DUs x $11,206 = $17,335,682) + (1,487 MFA DUs x $3,514 = $5,225,318 = $22,561,000] - Scenario No. 1

$24,743,916 [(1,697 SFD DUs x $11,206 = $19,016,382) + (1,631 MFA DUs x $3,514 = $5,731,334) = $24,747,916] - Scenario No. 2

$25,182,488 [(1,727 SFD DUs x $11,206 = $29,352,162) + (1,819 MFA DUs x $3,514 = $6,829,726) = $25,182,488] - Scenario No. 3

(b) Inadequacy of Statutory School Fees to Fund New School Facilities

The District currently is authorized to levy School Facilities fees ("Statutory School Fees") pursuant to Education Code Section 17620 et seq. and Government Code Section 65995 et seq. in the amount of $0.8951 per square foot of new residential development.[2] Based on an

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[1] The District has assumed that 61% of new residential development will be in the District's boundaries and 39% will be in Solana Beach Elementary School District's boundaries for all the reasons discussed herein.

[2] The SFD and MFA School Facility cost impacts do not include interim School Facilities or transportation impacts.

[3] The remaining $3,015 of Statutory School Fees are allocated to the San Dieguito

(continued...)

Response

84. The Final MEIR has been revised to show the number of dwelling units within the boundaries for the Del Mar and Solana Beach school districts.

85. The mitigation agreement(s) and community facilities district(s) shall establish funding to be provided for school facilities.

86. Comment noted.

Bowie, Arneson, Wiles & Giannone

Response

City of San Diego
May [illegible], 1998
Page [illegible]

assumed average of [illegible] square feet per SFD DU and 1,030 square feet per MFA DU, the District would collect an average of $2,238 per SFD DU and $904 per MFA DU [illegible], for a total of:

$4,806,434 [(1,5[illegible] SFD DUs x $2,238 = $3,462,186) + (1,487 MFA DUs x $904 = $1,344,248) = $4,806,434] - Scenario No. 1

$5,272,310 [(1,6[illegible] SFD DUs x $2,238 = [illegible]1,797,886) + (1,6[illegible] MFA DUs x $904 = 1,474,424) = $5,272,310] - Scenario No. 2

$5,364,762 [(1,7[illegible] SFD DUs x $2,238 = $3,865,[illegible]) + (1,[illegible] MFA DUs x $904 = 1,499,[illegible]) = $5,364,762] - Scenario No. 3

87 Statutory School Fees, under any of these scenarios, will not provide the District with the funds necessary to adequately house the students and mitigate the school facility impacts which will be generated from the Land Use Proposal, resulting in unfunded School Facilities needs of an estimated:

87 See response 85 above.

$17,754,566 [$22,56[illegible] - $4,806,434] - Scenario No. 1

$19,435,606 [$24,7[illegible],916 - $5,272,310] - Scenario No. 2

$19,8[illegible],7[illegible] [$25,[illegible] - $5,364,762] - Scenario No. 3

Unfunded School Facilities are not merely a socioeconomic impact but a physical substantial adverse environmental impact under CEQA. The District has a statutory mandate to educate the students within its jurisdiction. If the District is required to educate students without an assured source of funds and without available capacity, at a minimum the policies underlying the enactment of CEQA are undermined, including the policy to consider critical thresholds for the health and safety of the people of California [Public Resources Code Section 21000(d)]. Expressions of legislative policy should be considered in acting upon general plans and amendments thereto. [*Schaeffer Land Trust v. San Jose City Council* (1989) 215 Cal.App.3d 612, 263 Cal.Rptr. 813.] An educational environment which houses students in excess of the

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[illegible] (continued)
Union High School District pursuant to Education Code Section 17623. Accordingly, the two school districts collect Statutory School Fees in the amount of $[illegible] per square foot of new development.

88 available capacity of the public schools which must educate such students creates critical adverse health and safety conditions. To grant Developers policy mandates of LUDA in this regard in order to not "burden" developers of property (whose projects create the impacts to be mitigated in the first place) is contrary to the Law. If new housing is to be approved without school capacity as demonstrated by such developments, the quality of the entire existing community is degraded.

89 As correctly pointed out in the Draft MEIR, the District is operating above capacity (Draft MEIR, pages 185, 191 and 194.) It should be noted, however, that the Draft MEIR's assessment of school capacity is overstated because the total capacity figures contained therein include the use of eleven portable classrooms to house students on a temporary basis. The District's educational policies discourage the use of portable classrooms to house students and are not counted as part of the District's permanent capacity. Accordingly, the overcrowded of District schools as stated in the Draft MEIR is further exacerbated. The current figures are as follows[4]:

Item	*1997-98 Capacity*[5]	*1997-98 Enrollment*[6]	*Excess Capacity (Shortfall)*
District Elementary Schools	2,154	1,858	(304)

(b) The City Must Mitigate School Facilities Impacts

90 Prior to any approval by the City of the Land Use Proposal, the City must require mitigation of School Facilities impacts to the District.

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[4] See Table I-C, page 6 of the District's Study.

[5] These figures do not include the Sunset or Carmel Valley Neighborhood 4 Elementary School.

[6] The source for this figure is the District's Fall 1997-98 CBEDS enrollment.

Response

88. See response 79 above.

89. Capacity figures are based upon available classrooms of the School District and reflect the current School District's policy to not adopt year round enrollment in any of its schools, which could increase available capacity of each school by approximately 20 percent.

90. See response 79 above.

While the California Legislature in 1986 enacted Assembly Bill 2926 (Chapter 887 of the Statutes of 1986 [Government Code Sections 53080[3] et seq. and 65995 et seq.] ("Statutory School Fee Legislation"), the Statutory School Fee Legislation included a cap on the amount of Statutory School Fees, presently in the amount of $1.93 per square foot of new residential development as noted above. Subsequent to the enactment of the Statutory School Fee Legislation, a trio of cases held that the Statutory School Fee Legislation did not apply to land use decisions involving legislative determinations by a local agency such as the City. [*Hon Development Company v. City of San Diego* (1988) 205 Cal.App.3d 1301, 252 Cal.Rptr. 825; *William S. Hart Union High School District v. Regional Planning Commission* (1991) 226 Cal.App.3d 1683, 277 Cal.Rptr. 645; and *Murrieta Valley Unified School District v. County of Riverside* (1991) 228 Cal.App.3d 1232, 279 Cal.Rptr. 422.]

91 The *Hon*, *Hart*, and *Murrieta* decisions all hold that the limitations set forth in the Statutory School Fee Legislation are not applicable to land use decisions involving legislative approvals such as a specific plan, zone change, development agreement and general plan amendment as are requested of the City by the Land Use Pb posal. Accordingly, since the Land Use Proposal involves an application for legislative approvals, the Statutory School Fee Legislation does not preempt or prohibit the City from requiring Mitigation Measures to fully mitigate School Facility Impacts.[4]

92 Additionally, the SCTLA Framework Plan clearly indicates and recognizes that Statutory School Fees are insufficient to fully fund the costs of new schools. Consequently, the Framework Plan requires developers to fund school construction. [SCTLA Framework Plan, at §8.3, p. 106.] Further, the City can adequately fund School Facility deficiencies CEQA, as well as the City's General Plan and policies of the City Council relating to schools, which is discussed in detail below.

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[3] Effective January 1, 1998, this statute became Education Code Section 17620.

[4] With regard to a CFD pursuant to the Mello-Roos Act of 1982, the California Supreme Court has stated that Government Code Section 65995 expressly excludes special taxes levied pursuant to the Mello-Roos Community Facilities Act of 1982 from the dollar limitations set forth in the Statutory School Fee Legislation. [*Kaiser Development v. Superior Court* (1991) 54 Cal.4th 911, 927, 16 Cal.Rptr.2d 226, 232.] Accordingly, there are no legal limitations prohibiting the City from utilizing a Mello-Roos District as a mitigation measure.

Response

91. See response 79 above.

92. See responses 79 and 80 above.

(c) Public Schools/Education

In addition to the above corrections to the Draft MEIR relative to the SGRs and number of Projected Students generated, please note the following information should also be corrected. On Page 343, Page 2, Line 3 in the Draft MEIR, it states that both Del Mar Heights Elementary School and Del Mar Hills Elementary School are located within the City of Del Mar. In fact, these schools are located within the City.

93

The Draft MEIR cites three (3) elementary schools in Subarea Plans 1 and 2. The elementary school site located between Carmel Valley Road and SR-56 within Subarea Plan 2 is unacceptable to both the District and State Department of Education. As to the other school sites, the District requires additional information prior to approval of the selection and reservation of the sites by the District's Board of Trustees and the State Department of Education. In order for the District and the State Department of Education to approve the selection and reservation of such sites, the alignment of SR-56 must first be resolved. The location of SR-56 within Subarea III, traffic circulation and street improvement plans raise significant safety issues, in addition to the human health and safety issues discussed below. Therefore, the District requires that prior to adoption of the Land Use Proposal, school sites acceptable to the District and State Department of Education shall be selected, reserved and the school site purchase agreements ("Purchase Agreements") be executed to the satisfaction of the District. The District further requests that the City include the District in the land use planning process for the areas adjacent to the school sites so as to ensure compatible uses next to the school sites.

94

(d) Proposed School Mitigation Measures

Pursuant to CEQA, significant impacts must be mitigated to a level of insignificance prior to approval of a project by the City. As discussed above, the Land Use Proposal will have a significant environmental impact upon School Facilities. The Draft MEIR proposes the following mitigation, monitoring and reporting requirement with respect to mitigating School Facilities impacts as a result of the Land Use Proposal:

> "The development of the proposed on-site elementary, junior high, and high schools would be completed, mitigation of the project's direct impact to the schools from the subarea plan. Agreements between the affected school districts and project applicants at the time tentative maps are processed would be required to ensure that the impacts on the educational services are mitigated to a level less than significant." (Draft MEIR, page 355)

Response

93 The Final MEIR has been revised to show that Del Mar Heights and Del Mar Hills elementary schools are located in the city of San Diego.

94 Comment noted. The Subarea Plan identifies school site locations with respect to each proposed SR-56 alignment. The traffic analysis prepared for the Subarea Plan addressed trip generation from all of the school sites and evaluated on-site intersection operations. See also response 79 above.

95 The above measure, while purporting to mandate the full mitigation of School Facilities costs through the development of private schools and agreements between the affected school district and the Land Owners/Developers, does not specify what the mitigation payments amounts shall be. Nor does the Draft MFIR Mitigation Measure address Out Purchase Agreements. Such agreements shall be negotiated to the satisfaction of the District prior to any development which is the subject of the Subarea Plan as is required by the Subarea Plan. [Subarea Plan, page 67.] Additionally, the Draft MFIR Mitigation Measure and Subarea Plan school mitigation condition are unconstitutional relative to the timing of when the Owners of all Owners and District shall execute a Mitigation Agreement. [Subarea Plan, page 67.] Accordingly, the above Mitigation Measure is inadequate as it is indefinite and uncertain and may not mitigate School Facilities impacts to below a level of significance. Below is the suggested Mitigation Measure language that should be incorporated into the MFIR and Subarea Plan as it relates to the District.

96 "Prior to City of San Diego ("City") Planning Commission approval of any legislative or discretionary residential development application relative to the Pacific Highlands Ranch (Subarea II) Subarea Plan ("Subarea Plan") within the Del Mar Union School District's ("District") portion of the City, the City shall require the major landowner, Pardee ("Pardee" or "Owner") to execute a School Facilities Funding and Mitigation Agreement ("Mitigation Agreement") substantially in the same form as attached hereto in the Technical Appendix to this Master Environmental Impact Report ("MFIR"). All other landowners ("Owners") shall execute a Mitigation Agreement with the District prior to City Council approval of any legislative, or discretionary residential development approval or issuance of a building permit within the Subarea Plan by the City Council. Pardee and Owners shall agree to pay specified mitigation payments in the amounts of eleven thousand two hundred and six dollars ($11,206) per single detached dwelling unit and three thousand, five hundred fourteen dollars ($3,514) per multi-family attached dwelling unit. These amounts shall be adjusted each January 1, beginning January 1, 1999, by the change in the Marshall-Swift Class "D" Wood Frame Index since the preceding January 1.

Pardee and the other Owners of development projects which contain land designated as a school site in the Subarea Plan, and as agreed to by the District and State Department of Education, excluding development projects approved prior to adoption of the

Response

95. See responses 79 and 80 above.

96. See responses 79 and 80 above.

> subarea plan by the City Council are required to enter into exclusive site purchase agreements ("Purchase Agreements") with the District. The Purchase Agreements shall be negotiated to satisfaction of the District prior to or concurrent with adoption of the Subarea Plan. The Subarea Plan shall not be effective until Purchase Agreements are fully executed by the affected parties. These Purchase Agreements shall commit Owners of designated school sites to sell those sites to the District and commit the District to buy those sites. The terms of the Purchase Agreements shall be negotiated between the relevant Owner and the District."

The District further suggests that the Mitigation Agreements entered between the District and Owners (Parties) be included in the Technical Appendices to the MEIR and the Subarea Plan.

qrr If, however, the Mitigation Measure stands as currently proposed by the Draft MEIR, it is subject to attack under CEQA. Courts have held that public agencies should not rely upon Mitigation Measures of unknown efficacy or contingency that such mitigation measure could mitigate impacts to an insignificant level. [*Kings County Farm Bureau v. Hanford* (1990) 221 Cal.App.3d 692, 727 - 728, 270 Cal.Rptr. 650, 667 - 668, see also *San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 151 Cal.App.3d 61, 198 Cal.Rptr. 634, 645.] In *Kings County Farm Bureau*, a court reviewed whether a final EIR was inadequate because it failed "to evaluate whether water would be available for ground water recharge as contemplated by [a] mitigation agreement." [*Kings County Farm Bureau*, 221 Cal.App.3d at 723 - 728, 270 Cal.Rptr. at 667.] The court in *Kings County Farm Bureau* found that the EIR in question was inadequate, in part, because the public agency found the ground water impacts from the project to be insignificant based upon a mitigation agreement which called for the purchase of ground water supplies without specifying whether such water, in fact, was available. [*Kings County Farm Bureau*, 221 Cal.App.3d at 727 - 728, 270 Cal.Rptr. at 667 - 668.]

In *San Franciscans for Reasonable Growth*, the court reviewed the City of San Francisco's analysis of a traffic mitigation measure as set forth in the city's EIR. [*San Franciscans for Reasonable Growth*, 151 Cal.App.3d at 79, 198 Cal.Rptr. at 643.] The court noted that the traffic mitigation measure set forth in the city's EIR simply required "that the project's sponsor help [the transportation agency] expand its capacity by paying an unspecified amount of money at an unspecified time in compliance with an as yet unenvisioned as unspecified state funding mechanism." [*San Franciscans for Reasonable Growth*, 151 Cal.App.3d at 79, 198 Cal.Rptr. at 644.] The court concluded that such mitigation measure was inadequate to mitigate both project specific and cumulative traffic impacts. [*Id.*]

Response

90. See responses 79 and 80 above.

Moreover, courts have held that it is impermissible to defer the development and implementation of concrete mitigation measures until after project approval. [Sundstrom v. County of Mendocino (1988) 202 Cal.App.3d 296, 248 Cal.Rptr. 352.]

98 Moreover, and to the school mitigation ordinance as proposed for this Land Use Proposal also. As previously requiring full mitigation as stated above, the Mitigation Measure is inadequate. Because the amount of funding is undefined, the finding of mitigation to beyond a level of significance is speculative and impermissible under CEQA. [See, e.g., *San Franciscans for Reasonable Growth*, 151 Cal.App.3d at 79, 198 Cal.Rptr. at 643-644.] Accordingly, the District suggests the Draft MEIR be revised to fully mitigate School Facilities impacts as required by CEQA.

99 This Land Use Proposal, further, is distinguishable from the project in the recent case *Goleta Union School District v. Regents of the University of California* (1995) 36 Cal.App.4th 1121, 43 Cal.Rptr.2d 110. In *Goleta*, the Court of Appeal held that classroom overcrowding, in and of itself, was not a significant environmental effect under CEQA, and that the EIR in question did not have to show how a facility projected enrollment increases or commit funds for new classrooms. In *Goleta*, however, the subject EIR dealt with the potential expansion of the University of California at its Santa Barbara campus, not the certain addition of new homes and a definite increase in student population. Moreover, in *Goleta* no environmental effects were identified other than school costs. With this Land Use Proposal, on the other hand, a substantial physical impact on the environment would be created in that new students would be added to already overcrowded school systems. Further, in *Goleta* no new school construction was necessary, while with this Land Use Proposal under Scenario No. 1, three new elementary schools, one junior high and an optional junior high school and four high schools (one public and one private) will be built and will have environmental environmental impacts. Finally, unlike *Goleta*, there will be significant cumulative impacts in the District from this and other projects within the SCTCA. We note that the Draft MEIR should review the cumulative effect of the Land Use Proposal on the District's School Facilities when combined with other future development projects within the District's boundaries.

2. Human Health and Safety

100 The Draft MEIR does not discuss the environmental impacts related to human health and safety related environmental impacts resulting from the Land Use Proposal in the event that the School Facilities required by the District as part of the Land Use Proposal are not concurrently constructed due to lack of resources being available to the District. Additionally, the Draft
101 MEIR must also address the safety issues raised by the alignment of SR-56.

Response

98 See responses 79 and 80 above.

99 See responses 79 and 80 above.

100 The operation of school facilities is not an impact of this development proposal and wholly within the control and responsibility of the School District.

101 No extraordinary safety issues related to the alignment of SR-56 have been identified. It is expected that proper engineering design of the freeway and standard safety procedures related to school operations would preclude safety impacts.

The Draft MEIR does not recognize that School Facilities are utilized as emergency disaster centers and as evacuation centers under Section 10128 et seq. of the Education Code. In the event of an earthquake or other disaster, the School Facilities would operate as emergency disaster centers. In a disaster should occur, such as an earthquake, the residents of Subarea III
102 would be unable to travel to other emergency disaster centers outside the area due to the destruction resulting from such disaster. The Draft MEIR does not discuss the significant effects from such impacts and any possible mitigation resulting from the failure to provide for an adequate disaster centers or centers for civil activities as contemplated by such statutory provisions. These health and safety environmental impacts must be mitigated to a level of insignificance prior to any approval by the City. These must also be reviewed together with cumulative impacts of other future developments.

In addition, the Draft MEIR does not adequately discuss the environmental impacts
103 which result from overcrowding of School Facilities should School Facilities not be constructed. Increasing the number of students on a particular school site will undoubtedly have a significant environmental impacts due to increased health and safety risks. Apart from reducing the size of playgrounds to accommodate interim portable classrooms and affecting the physical health and training of the students, there is an increased exposure to transmittable diseases, which will be more easily transmitted when class size and or the number of students at a particular school site is increased. Also, overcrowded schools will result in impacts to restroom facilities, drinking fountains, student walkways, school site access, outdoor physical areas, and parking.

Each of these environmental impacts are significant, however, such impacts are not discussed in the Draft MEIR. Accordingly, the Draft MEIR must discuss such health and safety impacts and propose concrete Mitigation Measures to mitigate such significant impacts.

3. Traffic and Circulation Impacts

The new schools contemplated in the Land Use Proposal will create the need to transport students to and from school each day. These trips would involve both busses and parents
104 transporting their own children, and possibly over major arterials. Accordingly, the District requests that the MEIR discuss the impact of student transportation which will result from the Land Use Proposal and measures to mitigate such impacts. Additionally, the traffic circulation and street improvement plans should consider student safety for school site egress and ingress.

Response

102. The comment suggests that school facilities are required to be constructed to serve as emergency disaster centers and as evacuation centers pursuant to the Education Code. This is not what the Education Code requires and construction of such centers is not a required measure to mitigate any possible impacts of construction of the development project.

103. See response 100 above.

104. See responses 94 and 102 above.

B. NECESSARY FINDINGS UNDER CEQA

Public Resources Code Section 21081 states that "no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects ... unless the public agency makes one, or more, of the following findings":

(a) that changes have been made which mitigate or avoid the significant effects;

(b) that the necessary mitigation measures are within the responsibility and jurisdiction of another public agency; or

(c) that specific economic, legal, social, technological or other considerations make infeasible the mitigation measures. [Public Resources Code Section 21081.]

105 Presently, it would be improper for the City to make any of the above three findings.[1] With regard to the first possible finding (i.e. that changes have been made which mitigate or avoid the significant effects identified above), the proposed Mitigation Measure for School Facilities as it does not, as currently proposed, adequately mitigate such impacts.

With regard to the second possible finding (i.e. that the necessary Mitigation Measures are within the responsibility and jurisdiction of another public agency), CEQA Guidelines Section 15091 provides that such findings cannot be made if the agency making the finding has concurrent jurisdiction to impose the mitigation measure. [CEQA Guidelines Section 15091(a).]
106 Accordingly, since the City has jurisdiction with regard to School Facilities and Growth Management with regard to its ability to deny legislative approvals of new development in the absence of adequate School Facilities, the City cannot make this second finding.

107 With regard to the third finding, i.e. that specific economic, legal, social, technological or other considerations make infeasible the mitigation measures, there is no substantial evidence

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[1] In order to make any of these three findings, the discussion in CEQA Guidelines Section 15091 requires that the City: (1) make the ultimate finding called for by the statute, (2) "state the finding must be supported by substantial evidence in the record; and (3) an explanation must be present to supply the logical step between the ultimate finding and the facts in the record."

Response

105 See responses 79 and 80 above. In addition, findings are made by the City Council in connection with approval of a project based upon evidence before the Council. It cannot be determined at this time whether such findings will be made and, if made, the basis for such findings.

106 See response 105 above.

107 See response 105 above.

before the City that the mitigation proposed by the District requiring full mitigation of School Facilities impacts (as well as the other impacts discussed above) is infeasible on the basis of economic, legal, social, technological or other considerations. The decisions of *Mira Development Corp. v. City of San Diego* (1988) 205 Cal.App.3d 1200, 252 Cal.Rptr. 825, *Williams St. Univ. City High School District v. Regional Planning Commission* (1981) 226 Cal.App.3d 1512, 277 Cal.Rptr. 635, and *Murrieta Valley Unified School District v. County of Riverside* (1990) 228 Cal.App.3d 1213, 279 Cal.Rptr. 438 authorize the City to consider the adequacy of School Facilities in considering legislative actions.

C. GENERAL PLAN

Government Code Section 65300.5 requires that the elements of a general plan comprise an integrated, internally consistent and compatible statement of policies. The Public Facilities, Services And Safety Element of the City's General Plan, which incorporates Genn. Policies 600-10 and 600-22, requires developers to obtain letters of school availability from impacted school districts. [City of San Diego General Plan, at 269.] Under these policies and the General Plan, "developers are responsible for the cost of environmental facilities required to house the students expected to reside in the proposed development." [City of San Diego General Plan, at 245.] With this Land Use Proposal, as stated above, each new student generated will cause the need for additional School Facilities. Accordingly, if the Land Use Proposal is approved without providing for the full mitigation of School Facilities impacts, the approval would be inconsistent with the City's General Plan.

108

D. NCFUA FRAMEWORK PLAN and SUBAREA PLAN

The NCFUA Framework Plan requires the financing of public facilities be consistent with Section 8 of the Framework Plan. According to Section 8,

> "No subarea plan will be adopted by the City Council without a letter from the relevant school district(s) indicating that the district concurs with sizing, phasing and financing plans established by the subarea plan or by a concurrent school facility planning process. **No subarea plan will be adopted without an agreement with the respective school district to compensate for any additional impact the development may have on schools.**" [NCFUA Framework Plan, at §8.3f, p. 106 (emphasis added).]

Additionally, the school mitigation condition and school facilities requirement in the Subarea Plan provide that:

Response

108 See responses 79 and 80 above.

"Those ongoing projects within Pacific Highlands Ranch, except for projects approved prior to adoption of the subarea plan by the City Council, must comply with School Mitigation Agreements (SMA) prepared in concert with the Del Mar Union, Solana Beach Elementary, and San Dieguito Union High School districts. The Pacific Highlands Ranch Subarea Plan includes the provision of three elementary schools, one junior high school and one senior high school. All development impacts within Pacific Highlands Ranch shall be mitigated as required by applicable state law. Prior to securing building permits, individual owners will be required to enter into SMA's with affected school districts which set forth the terms and methods for mitigating impacts to school facilities."

"Owners of development projects which contain land designated as a school site in the Pacific Highlands Ranch Subarea Plan, excluding development projects approved prior to adoption of this subarea plan by the City Council, are required to enter into school site purchase agreements with affected school districts. School site purchase agreements shall be negotiated to satisfaction of the affected school district's prior to or concurrent with adoption of the subarea plan. The subarea plan shall not be effective until purchase agreements are fully executed by the affected parties. These purchase agreements shall commit owners of designated school sites to sell those sites to the affected school district and commit the school district to buy those sites. The terms of the purchase agreements shall be negotiated between the relevant owner and the affected school district." [Subarea Plan, page 6-7.]

109 The Subarea Plan is consistent with the NCFUA Framework Plan provided that the Mitigation Measure is revised to provide for specific mitigation payment amounts as indicated above.

V. REQUEST FOR NOTICE

110 Pursuant to Public Resources Code Section 21092.2, we hereby request that copies of all notices and other documents mailed or distributed relative to the Land Use Proposal be furnished to the District at its office, located at 225 Ninth Street, Del Mar, California, 92014-2716, to the attention of Mr. Thomas F. Bishop, Superintendent, and to our offices to the attention of Alexander Dowse. If there are any fees or charges required for the provision of such notices,

Response

109. See responses 39 and 80 above.

110. Comment noted.

please provide our office with an invoice for such costs and we will pay such costs. The Request for Notice specifically includes, but is not limited to, notices of all hearings, proposed actions to be taken with regard to the development process, requests for information, draft environmental documents, staff reports or communications, and, in particular, any Draft responses to, or Final MEIR prepared, furnished or filed with regard to the Land Use Proposal pursuant to the California Environmental Quality Act ("CEQA") and copies of all Planning Commission and City Council Agendas where the matter will be calendared.

F. CONCLUSION

In order to ensure that the impacts from the Land Use Proposal are fully mitigated, the District respectfully requests that Planning Commission approval of the Subarea Plan be deferred
111 until a Mitigation Agreement is executed by the Owner Parties and District. The Mitigation Agreement with the Owner should also be included in the Technical Appendices to the MEIR and the Subarea Plan. Furthermore, the Mitigation Measures and financing programs also shall require that prior to approval of any legislative or discretionary residential development applications, or issuance of a building permit within the Subarea Plan, the remaining SPHE Owners within Subarea III shall enter into a Mitigation Agreement. These Mitigation Agreements shall require the Owner and SPHE Owners to fully mitigate the significant impacts to be incurred by the District and to pay specified mitigation payment amounts as set forth above.
112 Moreover, the District respectfully requests that the Draft MEIR be revised to include a discussion regarding the significant impacts discussed above relating to traffic and health and safety concerns, as well as the Purchase Agreements.

113 Also, we believe the Land Use Proposal including Subarea Plan 1 and Subarea Plan 2 lacks the definite and certainty to allow the MEIR to be prepared until one Subarea Plan is approved. On the basis of the foregoing, it is respectfully submitted that the City should defer Owner proceedings until a decision is made on SR-56. Hence, we request that the comment period be extended for a reasonable amount of time after the City Council has decided whether to approve SR-56 Alignment "F" or Alignment "H".

Very truly yours,

BOWIE, ARNESON,
WILES & GIANNONE

By _____
Deborah B. Gianinno

Response

111. See responses 79 and 80 above.

112. See response 94 above.

113. See response 81 above.

BOWIE, ARNESON, WILES & GIANNONE

City of San Diego
May 18, 1998
Page 17

DRC:sd
Enclosure

cc: Mr. Thomas E. Hickey, Superintendent, Del Mar Union School District
Ms. Katherine Lanier, Del Mar Union School District
Mr. [illegible] Duvernay, Esq., Office of the City Attorney
Ms. Cathy Winterrowd, Development Services - Land Development Review Division
Mr. Benjamin Bolinka, David Taussig & Associates, Inc.
Mr. Alexander Bevan, Esq.

solana beach school district

RECEIVED

Ms. Bibian Lowery
City of San Diego
Land Development Review Division
1222 First Avenue
Mail Stop 501
San Diego, California 92101

Re: Draft Master Environmental Impact Report
Pacific Highlands Ranch

Dear Ms. Lowery:

The Solana Beach School District ("District") appreciates the opportunity to comment upon the draft Master Environmental Impact Report ("MEIR") for the Pacific Highlands Ranch Project (the "Project") located in Subarea III of the North City Future Urbanizing Area. Development of Pacific Highlands Ranch, depending on various alternatives, would result in approximately 5,000 new residential units, some of which would be located within the boundaries of the District and others within the boundaries of the Del Mar Union Elementary School District ("Del Mar"). As set forth in more detail below, any of the Project alternatives will create a substantial and cumulative physical impact upon the District's facilities, and will result in the need for additional school sites and school facilities.

Table 5-1 of the MEIR rightfully concludes that the Project would create a significant direct and cumulative impact on school facilities. The mitigation measure set forth therein is as follows:

> Mitigation of the Project's direct impacts to schools expected to occur if the Subarea were to be accomplished by the development of the proposed land use scheme. At the time tentative maps are processed, agreements between the affected school districts, the applicant, and the City would be required to ensure that impacts on educational services are mitigated to below a level of significance.

114 The District is pleased to report that it has been meeting on a regular basis with representatives of Pardee Construction Company ("Pardee"), the Project proponent, and that the parties have made substantial progress in developing a mitigation agreement and funding mechanism to provide for additional school sites and facilities needed to house the students generated from the Project. The District expects these meetings to continue, and has found Pardee to be extremely cognizant of the impacts of the Project upon District facilities, and very amenable to providing full mitigation of those impacts. Prior to any action to approve the Project by the City Planning Commission

Response

114. See response 79 to the Del Mar Union School District letter of comment

or City Council, the District would request that Pardee be required to provide evidence of entering into a mitigation agreement which will provide for school impact mitigation at a level acceptable to the District. This has been the direction which Pardee and the District have been taking since discussion began approximately three months ago.

115 Before analyzing the impact of each possible development plan, the District must first object to the fact that the draft MEIR, while acknowledging that two elementary school districts will be affected by the Project (Solana Beach and Del Mar), makes no differentiation as to the number of residential units located in each of the two districts. Additionally, no maps were provided to show the boundaries of the two elementary districts and how those boundaries correlate with the proposed alignments of SR-56, as discussed in the draft MEIR. Indeed, discussion of the Project's impacts (page 151 of the draft MEIR) would lead one to believe that a single elementary district will be serving the students of the Project. As a result, it is impossible for the District to adequately analyze the Project's impact upon its facilities based upon the information in the draft MEIR. The District has been able to obtain additional information from Pardee in order to formulate this response to the draft MEIR, however, the District requests that the final MEIR contain school impact information on a district-by-district basis rather than treating the Project as though it affects only one elementary district.

Taking each of the Project Alternatives individually, the District's comments are as follows:

116 1. Subarea Plan I (SR-56 Alignment "F"). This alternative, commonly referred to as "Alignment F" herein, would create from 4,974 to 5,459 residential units of varying types and provides for a total of three elementary school sites. Since it is not possible to determine from the draft MEIR how many of these dwelling units are within District boundaries, the District requested supplementary information from Pardee, a copy of which is attached hereto as Exhibit A. That information shows that Alignment "F" will produce 3,106 residential dwelling units within District boundaries, including 1,937 new single-family detached units, 145 single family detached units and 24 multi-family attached units from Del Mar Highlands Estates (another Pardee project which has already received City approval and which is the subject of a separate agreement between Pardee and the District). Using the District's Student Generation Factor (SGF) of 0.16 for single-family homes and 0.43 for multi-family attached homes, these 2,109 units will produce 400 new elementary students. As noted at page 343 of the draft MEIR, existing District facilities are too far away (3.5 miles) to serve students from the Project on a long-term basis. Additionally, there is no space available on any of the District's campuses for 305 new students. Existing school facilities are at, or over, capacity and 43 portable buildings have already been added to temporarily house students beyond permanent capacity. Therefore, Alignment "F" will result in the need for approximately one and one-third new elementary schools located on two new school sites. The cost in 1998 dollars for a 10-acre school site and a complete elementary school is approximately $14 million.

117 Alignment "F" identifies two elementary school sites (Figure 3.7-1). One is a 10-acre site adjacent to a 5-acre park, and the other is a stand-alone 10 acre school site. The District is satisfied with the general location of these two sites and specifically requests that both sites be reserved if Alignment "F" is selected. The District will not object to the second school site (the 10 acre stand alone site) having underlying zoning for residential development.

Response

115. See response 94 to the Del Mar Union School District letter of comment.

116. The Del Mar Highlands Estates project is not part of the current project. This project was previously approved by the City Council and is not analyzed in this EIR.

117. Comment noted.

118 Alignment "F" identifies two elementary school sites (Figure 3-1). One is a 10-acre site adjacent to a 5-acre park, and the other is a stand-alone 10 acre school site. The District is satisfied with the general location of these two sites and specifically requests that both sites be reserved if Alignment "F" is selected. The District will not object to the second school site (the 10-acre stand-alone site) having underlying zoning for residential development, should the District determine that it does not need a second school site in that area. However, it must be clear that the site may not be developed as other than a school site without the District's written approval.

119 At this time, the boundary between the District and Del Mar is not along existing and/or proposed major streets. Therefore, it is very likely that a boundary adjustment between the two districts will be required in order to prevent students in the same neighborhood from going to schools in different districts. Alignment "F" provides for the least required adjustment to the existing boundary which could be expected to run along Del Mar Heights Road and Carmel Valley Road. Therefore, even though Alignment "F" produces more students for the District, the District supports Alignment "F" as the preferred Subarea plan so long as: (1) two elementary school sites are provided, and (2) the District has entered into an agreement with Pardee for full mitigation.

2. **Subarea Plan 2 (SR-56 Alignment "D").** Subarea Plan 2 (commonly known as Alignment "D") incorporates a more northerly alignment for SR 56. According to the draft MEIR, this would result in 6,973 to 8,014 additional residential dwelling units. Again, while it cannot be determined from the draft MEIR itself, information from Pardee indicates that Alignment "D" would include 1,195 single-family detached units and, including Del Mar Highlands Estates, the total units would be 1,367.
120 Using the District's SAF, 562 new students would be generated. Alignment "D" would also clearly require one new elementary school site and school. However, the District is very concerned that the Project could generate more students than anticipated or that, because of density transfers or school district boundary realignments, additional students could be generated from Alignment "D". Therefore, the District requests that "optional" school site No. 2 be maintained under Alignment "D" subject to underlying zoning which would permit residential use if the District determined it did not need the second school site.

121 Alignment "D" would require substantial revisions to existing boundaries between Del Mar and the District where the existing boundaries would run through the middle of numerous residential planning areas and would create slivers of property between District boundaries and SR 56. Therefore, the District does not support Alignment "D" as the preferred alternative plan.

3. **Central Alignment for SR-56.** The Central Alignment alternative is similar to the proposal for Alignment "F" and, based upon information received from Pardee, would result in the same number of single family detached residential units (2,107), including Del Mar Highlands. Therefore, approximately 909 new students would be generated, which would need to be housed in two new school facilities (the second
122 school facility being only proportionally filled from this Project). According to Figure 8.6 in the draft MEIR, the Central Alignment for SR 56 would place all residential dwelling units north of SR-56. Therefore, a boundary adjustment between the two school districts along Del Mar Heights Road and Carmel Valley Road would be required.

Response

118. Comment noted. The terms of the District's acquisition of a school site should be set forth in the mitigation agreement.

119. Comment noted.

120 These comments on the District's position on the proposed project Subarea Plans and the alternatives are acknowledged.

121. These comments on the District's position on the proposed project Subarea Plans and the alternatives are acknowledged.

122 These comments on the District's position on the proposed project Subarea Plans and the alternatives are acknowledged.

Ms. Eileen Lower
May 15, 1998
Page Four

123 5. **Alternate Site Design - Plan 1.** Chapter 8 of the draft MEIR discusses Project Alternatives, one of which is an alternate site design for Plan 1 (Alignment "E"). The District continually opposes this alternate since it does not include any elementary school site within District boundaries. As previously indicated, the draft MEIR states that the District does not have sufficient school facilities to serve these students.

124 6. **Alternate Site Design - Plan 2.** The District's comments with regard to this alternate site design for Alignment "D" are the same as for Alignment "E". Again, this design does not include any elementary school sites or facilities to serve the Project. District policy dictates that alternate site design for Plan 2 is unacceptable.

6. **Development without a Phase Shift.** The District recognizes that approval of Alignment "E" or Alignment "D" must be given by the voters before the Project can proceed with the other related discretionary approvals. However, Pardee had underlying approval for A-1-10 zoning without Phase Shift Election approval and, with clustering, could build approximately 551 units. Figure 8-3 shows the non-phase alternative for Alignment "E", and does not indicate that any school site would be available within the District's boundaries under this alternative. It appears that approximately 345 residential units (which the District must assume are single family attached) would be within the District's boundaries.

125 Using the SGR of .454, they would generate approximately 157 students. The District requests that a school site of at least 10 net usable acres be required, even under the non-phase shift alternative for Alignment "E", since the District has no school facilities in that location and would need at least a small elementary school to serve this Project and potentially other projects within the North County Future Urbanizing Area.

126 If Alignment "D" were selected under a non-phase shift plan, the impact on the District would actually be greater than under the non-phase shift Alignment "E". Under non-phase shift Alignment "D", 358 units appear to have no streets or district boundaries are shown to be within the District's boundaries, which would generate 456 new elementary school students (see Figure 8-4). Again, the District requires the acquisition and identification of one school site of ten net usable acres in an acceptable location.

The District appreciates the fact that the City has always taken school facilities into account when determining the impact of a residential development project upon the environment.
127 The draft MEIR indicates that 1,291 new elementary school students would result from the Project, to be housed in either the Del Mar or Solana Beach school districts, which are both already operating above capacity. School impacts are environmental impacts, and must be adequately mitigated. El Dorado Union High School District v. State Board of Education (1983) 154 Cal. App. 3d 779. At the legislative approval stage, the City has a great deal of latitude in determining appropriate mitigation. Murrieta Valley Unified School District v. County of Riverside (1991) 228 Cal. App. 3d 1282. Overcrowded schools create a negative physical impact upon the environment and upon school districts. Double sessions are not a viable alternative, and portable classrooms can be used only until needed playground space is lost. Furthermore, while portable classrooms can be added on a temporary basis, overcrowding affects core facilities such as classrooms, cafeterias, libraries, etc. which cannot be easily expanded. Finally, overcrowding causes stress among staff and students and creates potential safety hazards.

Response

121 These comments on the District's position on the proposed project Subarea Plans and the alternatives are acknowledged.

124. These comments on the District's position on the proposed project Subarea Plans and the alternatives are acknowledged.

125. The non-phase shift alternatives could be pursued if the City Council does not approve the project and the voters do not approve the proposed phase shift. No affirmative action is proposed or requested nor will any action be taken to adopt the non-phase shift alternatives.

126. The non phase shift alternatives could be pursued if the City Council does not approve the project and the voters do not approve the proposed phase shift. No affirmative action is proposed or requested nor will any action be taken to adopt the non phase shift alternatives.

127 See responses 79 and 80 to the Del Mar Union School District letter of comment.

Ms. Eileen Lower
May 15, 1998
Page Five

California Environmental Quality Act (CEQA) Guideline 15064 (f) makes it clear that if a project would cause overcrowding of a public facility resulting in an adverse effect upon people, the overcrowding is regarded as a significant effect. It is impossible for the District to house all of the students that will be generated from the Project in existing school facilities. Therefore, the District respectfully requests that Pardee be required to enter into an agreement for full mitigation according to District standards, as well as a financing method in order to achieve the necessary results prior to approval of the Project by the City's Planning Commission. Although the District is generally confident that an agreement with Pardee will be reached within the next few weeks, it nevertheless wishes to protect its interests through this letter.

128

If you have any questions or need additional information, please do not hesitate to contact me.

Very truly,

Ellie Topolinac

Ellie Topolinac
Superintendent

cc: Board of Education
Ski Harrison
Benjamin DeLuga
Jim Frank/Pardee Construction

Response

128 See responses 79 and 80 to the Del Mar Union School District letter of comments.

solana beach school district

Ms. Eileen Lower
City of San Diego
Land Development Review Division
1222 First Avenue
Mail Station 501
San Diego, CA 92101

RECEIVED

Response

Re: Draft Master Environmental Impact Report
Pacific Highlands Ranch

Dear Ms Lower:

1229 Enclosed please find Exhibit A to the Solana Beach School District's response. If you would please attach this to our response as it was left off of the original sent to you on May 15th.

329 Comment noted

Thank you and if you have any questions please call me at 619-755-8159

Sincerely,

Linda Bechtel
Administrative Services

Enc.

Response

PR-58

San Dieguito
Union High School District

Facilities Planning Dept.
710 Encinitas Blvd
Encinitas, CA 92024-3147
(760) 753-6491
FAX (760) 943-3909

May 28, 1998

RECEIVED

MAY 29 1998

Eileen Lowes, Environmental Planner
City of San Diego
Development and Environmental Planning Division
1222 First Ave., Mail Station 501
San Diego, CA 92101

RE: Pacific Highlands Ranch (Subarea III)
Response to Draft Master Environmental Impact Report

Dear Mr. Lowes:

This letter will serve to clarify information about San Dieguito Union High School District in the Draft Master Environmental Impact Report.

130 In the last paragraph on page 141 of the Draft Master EIR, the report states that Earl Warren and Torrey Pines are operating at 94.1% and 93% of permanent capacity. This is incorrect. Earl Warren and Torrey Pines are operating at 159% and 130% of permanent capacity. This is based on the following capacity data:

School	Permanent Capacity	Temporary Capacity	Total Capacity	Enrollment as of 12/97	Enrollment as a Pct. of Perm. Capacity
Earl Warren Jr. High	695	448	1,143	1,034	158%
Torrey Pines High	1872	510	2,382	2,388	130%

131 In Table 61-1 on page 144, the Student Generation Rates Gowan are incorrect and incomplete. We use the following Student Generation Rates on a district wide basis to calculate projected enrollment and facility financing:

	Single Family Dwelling	Multi Family Dwelling
Grades 7 - 8	0.11	0.02
Grades 9 - 12	0.22	0.07
Total	0.33	0.09

Response

130. The final MEIR has been revised to reflect these capacities for Earl Warren Junior High and Torrey Pines High schools.

131 The final MEIR has been revised to reflect these student generation rates.

We want to reiterate our concern about the over-crowding of our school facilities that will serve this area. Any increase in population will exacerbate the situation. These factors in conjunction with the unavailability of state funds for school construction has necessitated our District's Board of Trustees to adopt a policy requesting developers to fully mitigate the impact of their project on the district's school facilities. Our position on the full mitigation of development impacts on our school facilities remains unchanged.

San Dieguito Union High School District appreciates the opportunity to provide information in response to concerns about the project. We look forward to working with the property owners, developers and representatives of the City of San Diego to ensure that adequate school facilities are available in a timely manner to serve the residents of the San Dieguito Union High School District.

If you have any questions, please feel free to contact me at (760) 753-6491 ext. 5515.

Sincerely,

Stephen G. Ma
Director, Facilities Planning

cc: Eric Hall, Asst. Superintendent, Business Services
Bill Hunter, Superintendent

Response

I-12 Comment noted. School impacts to the District would be mitigated per the requirements described in the final MEIR.

San Diego County Water Authority

A Public Agency

3211 Fifth Avenue • San Diego, California 92103-5716
(619) 682-4100 FAX (619) 297-0511

May 18, 1998

Ms. Eileen Lower, Environmental Planner
City of San Diego
Land Development and Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

RECEIVED

MAY 19 1998

Dear Ms. Lower:

Review and Comment on the
Draft Master Environmental Impact Report for Pacific Highlands Ranch (Subarea III)
Subarea Plan in the North City Future Urbanizing Area (NCFUA) SCH #97111047

Thank you for providing the San Diego County Water Authority (Authority) with a copy of the above-referenced document. We have reviewed relevant portions of the documents and offer the following concerns and comments:

Right of Way

133 The Authority requests notification and consultation from the City's Land Development and Review Division if any aspect of the proposed project conflicts with or may impact Authority ROW or facilities. Please contact Fred Clark of the Right of Way Department at (619) 682-4167 regarding proposed improvements affecting any Authority rights of way.

Public Facilities and Services

134 In the water section (page 349), existing, planned and proposed water treatment and distribution facilities are discussed. It states the proposed Carmel Mountain Road Pipeline is required and will ultimately affect supply to the Pacific Highlands Ranch. However, in the impacts to water service (page 355), it says, *The existing regional infrastructure would be sufficient to provide the projected water consumption volume. Local improvements would be required to bring water to the site.* Please clarify what is meant by "regional infrastructure", i.e. is the Authority or the City's domestic water system. In addition, the Authority strongly recommends and encourages a letter of commitment

MEMBER AGENCIES

Response

133. The County Water Authority will be notified as requested.

134. The Carmel Mountain Road pipeline is a planned regional Capital Improvement Project which could affect the water supply to Pacific Highlands Ranch. Appendix B of the Pacific Highlands Ranch Subarea Plan identifies the water infrastructure requirements which would be needed to accommodate buildout of the proposed project. The facilities that would serve the community and the options for meeting the future needs are included. A Public Facilities Financing Plan has also been developed which identifies the necessary on-site water pump stations.

135 from the City to withstand a ten day outage of Authority water supplies. The Authority recommends that the analysis of water service include a discussion of the present and future conditions with respect to the regional water supply. The document should recognize that the cumulative impacts of similar development throughout the county will require further additions to the regional water supply and distribution infrastructure to maintain acceptable levels of public service.

136 Illustrate on Table 4L-4 "Estimated Water Usage" (page 356) the reductions in water use that could be achieved through the use of reclaimed water to be consistent with the text on page 349 (e.g., provide an additional column to display a new total with appropriate land use areas subtracted.)

137 Also, include (in this section or in water conservation section) a table showing quantity of existing agricultural water use. This table would quantify the statement (page 364) "trade one kind of water use for another." It is not clear as to whether the quantity traded will be equivalent, but it is implied. This table or additional text would quantify the claim of deferred usage.

Conservation

138 Add in the first paragraph (page 362) that San Diego County is an ex officio member agency of the Authority. Also state that the Authority is a water wholesaler, and purchases the imported water from Metropolitan Water District and the member agencies are the retailers who provide water to the general public.

139 The Authority supports the City's Land Development and Review Division's conservation measures emphasizing innovative water supply techniques involving local water resources, reclamation and watershed management. Mitigation measures for conservation should also incorporate water conservation requirements such as the use of xeriscape landscaping techniques, a discussion of the potential uses of reclaimed water and Best Management Practices for water conservation. Water conservation is imperative in Southern California and conservation measures need to be detailed in the Master FEIR. If you have any questions about conservation measures, contact Bill Jacoby of the Water Resources Department at (619) 682-4156. The Authority also encourages development of water reclamation, groundwater recovery projects and administers financial assistance programs for their development. For more information on the Authority's water reclamation projects and programs, call Cheryl Munoz of the Water Resources Department at (619) 682-4154.

Response

133. Comment noted. See response 134 above.

136. The use of reclaimed water is not a component of the Subarea Plan but was been included in this section of the EIR. The city of San Diego defined the scope of the optimized service area for reclaimed water distribution and as part of that determination there is no surety that a reclaimed water system would be provided to this portion of the city.

137. The final MSEIR has been revised to clarify this statement.

138. The additional information has been added to the final MSEIR.

139. Comment noted.

Response

Please retain the Authority on your mailing list to receive the Master FEIR and other information concerning this project. If you have any questions, please contact Melissa Dwight at (619) 682-4267.

Sincerely,

Lawrence J. Purcell, Manager
Water Resources

LJP:mmc

cc Fred Clark
Bill Jacoby
Cheryl Munoz
Mo Sqal

MEMORANDUM

DATE: June 2, 1998 SANDAG RSO 11.9(2220)

TO: Eileen Lower, City of San Diego

FROM: DeSaan Savage

SUBJECT: Pacific Highland Ranch (DEIR)

MTDB has reviewed the proposed project with respect to the Framework Plan for the North City Future Urbanizing Area (Framework Plan) and the City's Transit Oriented Development (TOD) Guidelines. As identified in the Framework Plan, Subarea III will include the single largest activity center of the Future Urbanizing Area and as such has the highest potential for transit ridership. In general, MTDB believes that the Pacific Highlands Ranch Draft Subarea Plan generally incorporates some of the guidelines set forth in both documents. However, MTDB recommends the following specific transit concepts be incorporated into the Plan to ensure overall consistency with the Framework Plan and TOD Guidelines.

[40] 1. Park and Ride. The proposed park and ride facility should consist of approximately 100 parking spaces and should be located at the proposed Transit Center to support and encourage transit usage. In addition, consideration should be given for the park and ride lot be shared with adjacent development in the proposed Village area.

[41] 2. Linkage to Employment Center. Transit ridership would be greatly enhanced with a pedestrian path connecting the Transit Center to the Employment Center. The path should be located along the public right-of-way with landscaping and connect to the primary building entrances in the employment center.

[42] 3. Pedestrian Environment. The Framework Plan calls for a high quality pedestrian environment and "sidewalks with street trees along all public and private streets". As such, the proposed 6 and 4-Lane Major Roads should be modified to provide non-contiguous sidewalks with street trees along the public right-of-way (Exhibit 4-5). In addition, the 6 and 4-Lane Major Roads divide the Village and Transit Center from the Community Park. It is recommended that narrow streets be considered in the core area and that enhanced pedestrian crossings be provided to connect the Village and Transit Center to the Community Park.

[43] 4. Transit Center Improvement Costs. MTDB expects that the costs associated with right-of-way acquisition, design and construction of the proposed Transit Center will be borne by the project developer consistent with the relocation of the Mira Mesa Transit Center.

If you have any questions, please contact Dave Schumacher at 557-4565 or Colleen Frost at 557-4533.

Response

[40] The park and ride facility has been modified in the Subarea Plan to accommodate 100 parking spaces next to the transit center. The relationship of the park and ride to the Village Center remains unchanged in the Subarea Plan.

[41] Two pedestrian paths exist in the proposed subarea plans which would link the transit center to the employment center.

[42] The design of sidewalks and street trees within the project area will be developed consistent with the Subarea Plan and to the satisfaction of the City Engineer at the time future development proposals are processed.

[43] The applicant and City have been and will continue to work closely with MTDB to ensure that transit issues are completed as soon as sufficient population exist to justify them. Funding for the Park-and-Ride and Transit Center are included within the Public Facility Financing Plan and Facilities Benefit Assessment.

May 18, 1998

Ms. Eileen Lower, Environmental Planner
City of San Diego
Development Services
LAND DEVELOPMENT REVIEW DIVISION
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Via Fax with original to follow

Re: Pacific Highlands Ranch (Subarea III) Subarea Plan in the North City Future Urbanizing Area (NCFUA)
- Comments on Draft Master Environmental Impact Report
LDR No. 96 7918 SCH No. 97111077

Dear Ms. Lower:

Thank you for the opportunity for the Fairbanks Ranch Association to comment on the Draft MEIR for Pacific Highlands Ranch Subarea Plan. The Association is considered about the impacts that might result from a project of this magnitude, particularly as they relate to the traffic circulation for this area.

The Traffic Circulation section of the Draft MEIR in Table 48-9 notes that El Apajo Road is classified as a 2-lane Collector street and is projected to have
144 15,600 ADT or Level of Service "E". The document states on page 154 that the Pacific Highlands Ranch project will contribute more than two percent of the traffic to the El Apajo road segment. However, no mitigation is offered to lower the traffic impacts to acceptable levels. This oversight should be addressed in the Final EIR document.

145 Similarly, it appears that the Pacific Highlands Ranch project will contribute more than two percent of the future traffic on San Dieguito Road between Rancho Dieguero Road to El Camino Real. Table 48-9 indicates traffic will reach 14,900 ADT or Level of Service "E" on this street segment. The only mitigation proposed by Subarea III is a traffic signal associated with the Del Mar Highlands Estates project. Additional mitigation such as the "Spot

Response

144 As shown on Table 20 of the traffic study, the project will contribute 6 percent of the projected ADT. This translates to only 450 trips. However, almost all (95 percent) of these trips are county residents that will use the new shopping facilities in the Subarea III Town Center or Subarea III residents that are attached to the Rancho Santa Fe Town Center area. No mitigation was suggested because county residents are provided local shopping opportunities in Subarea III which removes existing trips from other county roads in the area.

145. East of the Del Mar Highlands estates access to San Dieguito project traffic is a maximum of 109 ADT which is about 1 percent of the capacity of San Dieguito Road. Since project traffic is less than 2 percent the impact is not significant and mitigation is not required. The traffic report will be edited to break out the segment of San Dieguito Road east of the Estates access. For the impacted segment of San Dieguito Road, two improvements are required of the Estates project. Turn lanes and acceleration/deceleration lanes are provided at the estates access to San Dieguito Road and at Old El Camino Real; a raised median is to be installed so that only right turns in and out are permitted.

improvements" included in the Black Mountain Ranch project EIR should be included by Subarea III.

146 More generally speaking the Association would recommend that as recommended by the City in the phasing plan for Subarea I, no portion of Subarea III that has not been already approved should be allowed to proceed until the connection of SR 56 between I 5 and I 15 is assured.

The Fairbanks Ranch Association has an ongoing concern with all the projects in the NCFUA and would therefore request inclusion on the distribution list for all future mailings, distributions, and notifications regarding the MEIR and all aspects of project approval.

Sincerely,

David J. Abraire, AICP
General Manager
FAIRBANKS RANCH ASSOCIATION

Response

146. Comment noted

Response

CARMEL VALLEY COMMUNITY PLANNING BOARD
12760 High Bluff Drive, Suite 150
San Diego, CA 92130
PH: (619) 794-2500/FAX: 259-6173

May 9 1998

Elizabeth Lower, Environmental Planner
LAND DEVELOPMENT REVIEW DIVISION
Development Services Department
1222 First Avenue, Fifth Floor
City of San Diego
San Diego, CA 92101

SUBJECT: PACIFIC HIGHLANDS RANCH (SA III) SUBAREA PLAN, IN THE NORTH CITY FUTURE URBANIZING AREA (NCFUA)

DRAFT MASTER EIR - LDR NO. 96-7858 - SCH NO. 97111077

Dear Mr. Lower

The SA III/Neighborhood 8A/State Route 56 components of this proposal each play a major role in Carmel Valley's final design and community integrity. The community's long term direct involvement with SA III and NBA [omitted] of the DMEIR and the SA III (SA II) development proposal on two core issues:

(1) The resulting impacts from a large-scale decrease in the Multiple Habitat Planning Area (MHPA) in SA III as a trade-off for preservation in NBA.

(2) How clearly the final MEIR lays out for the public and decision makers exactly what they are to decide and the land use and environmental policies and goals for each SA III and NBA that should drive these decisions.

Multiple Habitat Planning Area (MHPA) Boundary Adjustment

The core of this proposal is to permit 150+ acres more development in SA III than permitted by the Council/State/Federal-accepted MHPA. The test of the DMEIR is whether it thoroughly addresses the above core issues. Specifically, does it adequately portray the land use and biological impacts of decreasing the MHPA in SA III by 150 acres? Are the DMEIR assessments of impacts and offsetting benefits consistent with existing goals and policies regarding the City's MHPA, Northern Tier Biological Core Areas in SA III and other adopted land use goals for the San Dieguito River Valley? We believe the DMEIR is deficient in both aspects for the following reasons:

147 This comment on the MHPA boundary adjustment is noted.

Response

<u>Summary DMEIR Description of the MHPA Boundary Adjustment</u>

> "This action would amend the City's MHPA to include the sensitive habitats located in (N 8A) and Subarea V (Deer Canyon and Lorenz Parcels), while removing other less sensitive areas within Pacific Highlands Ranch (approximately 150 acres) and (CV) N 10 (approximately 6.1 acres) from the preserve system . . The boundary adjustment components include an adjustment of the MHPA line to increase the size of the preserve within the (N 8A) area. Thus, the proposed MHPA boundary adjustment is considered superior in biological value to the adopted MHPA." [S-16 17 AND P. 61]

148 The Deer Canyon component is the transfer of an additional 6 dwelling units in Subarea V (60 acres) to the Lorenz Parcel (78 acres) "(to) allow construction of 45 dwelling units on the Lorenz Parcel." [p. 61] The DMEIR does not clarify the net gain to the MHPA of this transfer. Would the transfer development to MHPA-designated open space on the Lorenz Parcel? What portion of the Lorenz Parcel is now in the MHPA?

148. Development rights would be transferred from the Deer Canyon Parcel to the western portion of the Lorenz Parcel which is not within the MHPA.

<u>Assumptions About N 8A MHPA Boundary</u>

149 Since the entire transfer of development footprint from N 8A onto SA III is considered "superior" to the existing MHPA lines in both, it is essential the final MEIR clarify that the <u>MHPA boundary in N 8A has never been officially determined.</u>

> "Precise Plans will be amended, but these amendments will not be done concurrently with MSCP adoption. Neighborhood Plan amendments will be required for (N)s 8, 8A, and 10 of Carmel Valley. Preserve boundaries may be modified by City Council action on the (N 8A) Precise Plan."
> [MSCP Draft Joint EIR/EIS, pp. 12 and 25]

The City Council continued the 1994 N 8A proposal, requesting a more biologically viable plan. As a result, the Council purposefully left undetermined the MHPA boundaries in N 8A. "No action has been taken on any of the (N 8A) project components although (it) was analyzed in the final MSCP EIR." [P. 17]

Therefore, it is speculative for the DMEIR to base a "superior" rating on an undetermined boundary. It is accurate to say that this proposal would define the N 8A MHPA boundary, but to use as a base the "Compromise Plan" MHPA is inaccurate.

149. The MSCP EIR did analyze the Carmel Valley Neighborhood 8A Compromise Plan as a worst case, and found that it was biologically adequate. The Compromise Plan for Neighborhood 8A supported an earlier agreement among the City, CDFG, USFWS, and Pardee.

<u>Arguments On Manipulating the MHPA With Two Separate Planning Areas</u>

The boundary "adjustment" proposed is really taking nine MHPA areas in SA III/Gonzales Canyon and reducing them to the narrowest possible configuration in order to consolidate the MHPA in N 8A.

150 <u>There is no question as to the importance of the entire N 8A/Carmel Mountain area in MSCP and Carmel Valley preservation goals or the DMEIR's treatment of this area. What has to be questioned, and thoroughly explained in the final MEIR, is the policy issue of depleting so severely MHPA lands in another primary habitat and biological area of importance to the City and the MSCP effort, an area important in its individual</u> role in MSCP preservation and unique and critical necessary [illegible]

150. Comment noted. See letter of comment above from the U.S. Fish and Wildlife Service.

151 this plan is considered "generally consistent with the MHPA" [p. 27]. However, the question is: "was the MHPA supposed to be adjusted in so broad a brush as to do wholesale reduction in an entire NCFUA Subarea, once, for its own sake?"

We request the final MEIR address these core questions by reviewing carefully MSCP/MHPA goals as described in the DMEIR.

> "The MHPA is the area within which the permanent MSCP preserve will be assembled and managed ...The MHPA is defined in many areas by mapped boundaries ...and is also defined by quantitative targets for conservation of vegetation communities and goals and criteria for preserve design." [p. 10]

152 Within the above text is the central quandary of this proposal. "The MHPA is defined in many areas by mapped boundaries" confirms that MHPA value exists on both SA III and N. SA, each important for different geographical reasons. They are distinct habitat and linkage areas with different MSCP roles.

153 The MHPA "also is defined by quantitative targets for conservation" means that habitat and linkages in SA III can be developed because an equation of X acres of Tier I, x acres of Tier II, etc. can be realized in N.BA. This specific definition of the delineation of the MHPA is the guiding principle of this proposal.

154 We believe our perceptions of the second definition has caused an excessive removal of MHPA in the northwest SA III to render what's remaining of questionable value. Cannot this be seen as a conflict with the first definition which recognizes the necessity of preserving specific geographic areas, namely MSCP-priority SA III?

MSCP "Functional Equivalency" Test

Both N.BA and SA III are core biological areas targeted for preservation in the City's Adopted Multiple Species Conservation Program (MSCP) Plan (1997).

> "the central portion of the northern Preserve area is composed of the heart of the City's ...NCFUA Subareas 2,3,4 and 5. ...the San Dieguito Lagoon area, Gonzales Canyon, and most of the area lying between the communities of Carmel Valley and Rancho Penasquitos. The southwestern portion [of N.BA] contains two major wildlife corridors that converge at CVREP, where they link to adjacent core habitat on and north of [N.BA]." [MSCP Subarea Plan, Volume].

Now adopted, MHPA boundaries can be changed only by careful consideration of key factors. Overall, the result must be "the same or higher biological value for the preserve." [p. 103]. Of particular interest are the following DMEIR assessments:

> "3. Effects on habitat linkages and function of riparian areas. (The adjustment maintains affected natural linkages at a minimum width of 1,000 feet, and provides a large block of habitat within the middle of a major linkage (i.e. Gonzales Canyon) to allow breeding, foraging and other natural life functions to exist in the linkage.")

Response

151. The City of San Diego has found that the proposed adjustment meets all of the requirements of a functional equivalency finding. USFWS and CDFG have concurred with that finding. See also the letters of comment on the draft MHPA from the USFWS and CDFG.

152. This comment on the MHPA definition is noted.

153. This comment on MHPA habitat linkages is noted.

154. Comment noted. The proposed MHPA adjustment makes it easier for the City to meet conservation goals by increasing the amount of Tier I habitat that will be located within the MHPA.

4. Effects on preserve configuration and management. "the adjustment generally either maintains the shape and size, or increases the size of the preserve ... and will not affect either configuration or the necessary level of management." [p. 104]

The DMEIR concludes that removal of 150+ acres of MHPA in SA III/Gonzales Canyon "meets these tests and is consistent with regional wildlife ... efforts." [p. 20]

We agree that the addition of approximately 75 acres of largely Tier I habitat ... in (N 8A) will greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration." [p. 104]

155 We cannot agree that the USCP equivalency test is being appropriately applied to justify this transfer, for the following reasons:

(1) Effects on habitat linkages and function of preserve areas. Encroachment of 44 acres into "Area 8" of the MHPA in Gonzales Canyon considerably reshapes and limits the "refugial" value of the primary coastal sage scrub slopes and mixed habitat area of Gonzales Canyon at a critical confluence of the NCFUA wildlife corridors (Subareas IV and V) as well as the rest of SA III into the western San Dieguito River Valley.

The critical importance of "Area 8" is supported by the City's own "Alternate Site Design - Plan 1 and Plan 2" (Figures B-1 and B-2) which not only leave this larger habitat area intact but also provide for its connection to the north with La Zanja canyon. [5-42]

How can this plan still "provide[s] a large block of habitat within the middle of a major linkage"? Development would cover 44 acres of +/-54-60 acres. Further, narrowing of the north-south Areas 7 and 8 corridors makes it even more critical as a small but necessary single expanse of habitat. Last, constricting Areas 7 and 8 through the north-south corridor—what was to be the major NCFUA corridor system—cannot be found to "maintain affected natural linkages a minimum width of 1,000 feet" since this new linkage would be approximately 800 feet to 900 feet wide. [p. 102]

Certainly the conversion of reducing corridor areas 7 and 8 to 800-900 feet and encroaching 44 acres into the only remaining expanse of habitat (area 8) cannot meet the USCP Functional Equivalency test for "Effects on preserve configuration and management" so that any adjustment "maintains the shape and size, or increases the size of the preserve. ..." [p. 104]

156 The MEIR would serve decision makers by addressing the following prescription for corridors from the "Wildlife Society Bulletin 20:431, 1992, pp. 434-440, which resulted from southern California research on "two types of corridor users":

> "Passage species' need (e.g., dispersal of a juvenile, seasonal migration, or moving between parts of a large home range). Large herbivores and medium-to-large carnivores are typically passage species, (and) many migratory animals ... It is important to avoid assuming that anything big enough for the animals to walk through is a corridor. Although these species do not have to meet all of their life requirements within the corridor, the corridor must provide conditions that motivate the animal to enter and use the corridor.

Response

155. The City of San Diego, USFWS, and CDFG have concurred with the finding that the proposed adjustment of the MHPA will result in a new MHPA that is functionally equivalent to the original MHPA. See letter of concurrence from the USFWS and CDFG.

156 The proposed adjustment maintains Gonzales Canyon at a minimum width of 1,000 feet and provides a "refugium" of roughly 140 acres. The City of San Diego has found that the proposed MHPA adjustment will maintain corridors that are functional, and the USFWS and CDFG have concurred with that finding. See letter from USFWS and CDFG.

"Corridor dwellers need several days to several generations to pass through the corridor must provide most or all of the species' life-history requirements

For passage species is the topography, vegetation and location such that the animal will encounter the entrance to the corridor? Is there sufficient shelter and concealment cover, food and water for the animal on a journey of this duration? For corridor dwellers are the topography, vegetation and location such that individuals will encounter enter, and live in the corridor?

The number of road crossings should be minimized Bridged underpasses are preferable to culverts "

Historical Importance of SA II/Gonzales Canyon to City Preservation Efforts

E57 The DMEIR concurs that the MHPA SA II corridors require restoration to enhance their long-term value " It would be more accurate to state the restoration goals for Gonzales Canyon/SA II of the following policy documents

"San Dieguito River Regional Plan" (adopted by the City of San Diego 1994)

"Restoration is especially important wherever an area serves as a linkage of wildlife movement corridor but only where preservation and appropriate buffers from human activities can be ensured Open space preserves are proposed (including) the San Dieguito Lagoon Gonzales and La Zanja Canyons "

"San Dieguito River Valley Regional Open Space Concept Plan (approved by the Joint Power Authority 1990 and the Board 1989)"

"Riparian Wildlife Corridor This plan presents as a priority the goal to preserve valuable riparian habitat and adjacent upland habitat areas in a continuous wildlife corridor

Preservation of the Natural Character of the River Valley This plan proposes that the natural character of the river valley mantained as it is now and where that natural character has been tarnished that it be restored "

Conservation There shall be a continuous riparian habitat corridor along the entire San Dieguito River and as tributary canyons in order to permit wildlife to move freely and between water sources and habitat The corridor shall have enough critical mass to endure a fully functioning natural ecosystem " (emphasis ours)

"NCFUA Framework Plan [FP" (adopted by the City of San Diego 1992) (p. 24) "The canyons which comprise Gonzales and La Zanja Canyons should be preserved (for) both habitat potential and natural scenic character "

Response

157. These comments on the NCFUA Framework Plan regarding wildlife corridors and open space are noted With respect to the alignment of SR 56, it is acknowledged that the mobile portion of SR-56 was assumed to be located somewhere in Subarea III in both the NCFUA Framework Plan and the MSCP However, both the NCFUA Framework Plan EIR and the MSCP EIR show the Coastal Alignment for SR-56. Shifting SR 56 from an area of open space into the development area reduces the area available to accommodate all other planned uses including the Town Center and Transit Oriented Development. The proposed encroachment by each of the Subarea Plans into the MHPA will allow the implementation of the land uses prescribed in the Framework Plan in a manner that minimizes the loss of existing natural vegetation throughout the Subarea

Possibly the strongest argument for retaining a large part of Area 8 in the MHPA is found in the Framework Plan which itself, brought approval of an "environmental tier" that reduced the open space of SA II much as this proposal does.

The Framework Plan's own final EIR found that the "reduced environmental tier proposed" would result in a conflict with the purpose and intent of adopted environmental plans or policies for the area[7]:

> "Open Space. The intent of the Environmental Tier was to designate large areas for preserve status. The lands identified in the tier were the minimum needed to satisfy that intent. The (tier) was reduced in the course of the framework planning process. . Areas for development were increased.
>
> "The Framework Plan (adopts) the proposed open space as part of the Environmental Tier. The reduction in the open space system significantly limits the potential for long-term preservation of the areas resources. [pp. 22-28]

The only way to substantially reduce land use impacts would be by "the adoption of the Environmental Tier Alternative. This would provide the maximum lands necessary for continued viability of the area's natural resources." [pp. 22-28]

In short, the NCFUA Framework Plan and certified EIR found that the original "environmental tier" [1990-1] was "the minimum" needed to preserve habitat in the NCFUA, especially in SA II where the most intense development was proposed. When it was reduced further and approved in 1992, the "potential for long-term preservation of the area's resources" was "significantly" limited.

The ensuing MSCP adopted restored levels of preservation--the MHPA-- almost identical to the first environmental tier, "the minimum lands necessary for continued viability." The DMEIR acknowledges this expansion:

> "The MSCP requires changes to the NCFUA Framework Plan that result in an increase in the size of the Environmental Tier areas through the deletion of development acreage. Most of the changes are located at Pacific Highlands Ranch. Consequently, the MSCP supersedes the Framework Plan and acknowledges the decreases in developable areas within the subareas by adoption of the MHPA boundaries." [p. 97]

However, importantly, the DMEIR inaccurately attributes the expansion into the MHPA in SA II solely to the need to "accommodate the realignment of SR 56 into the
|58 development area of Pacific Highlands Ranch." [p. 58] How can this be stated since all NCFUA and MSCP documents all assumed the middle portion of SR 56 somewhere in SA II?. The additional expansion proposed is private development as well which must be attributed their share of the cause for expansion into the MHPA.

"The negative impacts associated with location of SR-56 within the MHPA are largely eliminated by the realignment into the development area. This expansion has been accepted by the numerous interested conservation and planning groups (including) Carmel Valley." [p. 58] The statement should be revised to say "numerous interesting

Response

158 The Final MEIR has been modified per this comment.

conservation and planning groups were involved in pursuing the general concept of removing MHPA areas on SA III in order to preserve N BA."

Deficiency of the DMEIR Regarding Analysis of Conflicts with City and JPA San Dieguito River Valley Land Use Goals:

The DMEIR finds no conflicts with the adopted goals for the Gonzales Canyon/San Dieguito River Valley at both the "San Dieguito River Regional Plan" or JPA-adopted goals in the park "Concept Plan." Both Plan(s) would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon. Therefore, they are considered consistent with the goals and objectives of the FPA." ["Table S-1]

159 How can the DMEIR consider only one or two of numerous SDRV goals in its analysis? The overriding conservation goals are not even considered in the summary of impacts. Doesn't this treat the SDRV as a mere trail system? How can the finding be made that the project would not "result in a conflict with the purpose and intent of any current planning process or adopted environmental goals or policies" regarding the SDRV? This section needs to be reinstated even in summary form to assess the effects on the river valley in the regional habitat system.

Council Policy 600-40 requires conformance with the City's environmentally sensitive lands ordinance and cannot be seen to be met with this DMEIR.

> "Council Policy 600-40 (serves to) (2) ensure protection of environmental resources by preserving vital (open space systems) and (3) ensure that adopted land use policies and objectives are considered ... which enables decision makers to determine the consistency of the plan with RPO and other adopted General plan and City Council policies and objectives." [p. 19]

Bridges Under Roadways In and Adjacent to SA III

The City of San Diego MSCP Subarea Plan "Preserve Guidelines" in the NCFUA include "(13) If funds become available, place a large culvert or bridge underroadway for wildlife movement where El Camino Real crosses the outlet of Gonzales Canyon into the San Dieguito River." [p. 26] However, the DMEIR is inconsistent on whether bridges or culverts are proposed and ambiguous regarding actual provision.

> "In order to facilitate wildlife movement, a bridge on Del Mar Heights Road would be proposed over the north-south MSCP open space corridor just west of its intersection with Carmel Valley Road." [p. 54]. In the next statement, "As with Del Mar Heights Road, a bridge would be provided on Camino Santa Fe south of SR-56 to allow east-west wildlife movement within the MSCP corridor."

Elsewhere, "Undercrossings (i.e., wildlife culverts) would be proposed beneath SR-56 and Del Mar Heights to facilitate wildlife movement."

The final EIR should clearly exactly what is proposed and how it is to be funded.

Response

159 The proposed Subarea III Plan's consistency with the San Dieguito River Valley Regional Open Space Park Concept Plan's major objectives is discussed below.

Gonzales and La Zanja Canyons open space corridors. Nearly half of both subarea plans are designated as MHPA open space. This open space preserves more than 1,200 acres of land, much of which is large areas of Tiers I, II, and III habitat. Within the preserved open space are wildlife corridors between the San Dieguito River valley to the south and the Los Penasquitos Canyon Preserve to the south. Off site linkages to the east provide access to Black Mountain Regional Park. Furthermore, approximately 400 acres of disturbed land within the MHPA for Pacific Highlands Ranch would be restored per a Master Revegetation Plan with appropriate upland and wetland habitats and a mitigation bank established. Much of this revegetation area consists of a manufactured wildlife corridor that would connect and provide for wildlife movement between Gonzales Canyon and McGonigle Canyon.

Development setback from ridgetops and sensitive architectural treatment. There are distant and limited views from the San Dieguito River Park into Pacific Highlands Ranch; however, these views are primarily of the already approved Del Mar Highlands Estates project portion of the subarea. Regardless of the proposed subarea plan and SR-56 alignment, the conversion of primarily rural agricultural lands with few access roads to the proposed urban uses under both plans would substantially alter the existing aesthetic character associated with the property. The unavoidable changes are considered significant and not mitigated impacts in the draft EIR.

Canyon overlooks and viewpoints will be provided along the community trail system, both within the right-of-way as well as in the open space corridors. Educational signage and benches would also be provided. These overlooks will be built by each developer, deeded to the City, as part of the trail system, and maintained by a Landscape Maintenance District or other financing entity.

Trail System. Pacific Highlands Ranch will include a subarea wide trail system. The trail system would include about 15 miles of hiking, biking, and equestrian trails that connect with existing paths within the Rancho neighborhoods. The trails would be located within the MHPA preserve as allowed by the adopted MSCP.

Downstream water quality would be protected by the construction of desilting basins in the subarea (see Figure 4D-3 of the draft EIR for alternative desilting basin locations) to reduce erosion and sedimentation during and after development. Monitoring and maintenance programs for these facilities would be prepared by future developers and after approval by the City, would be incorporated into the CC&Rs for the developments with these facilities as their common areas.

conservation and planning groups were involved in pursuit of the general concept of [removing MHPA areas in SA III in order to preserve IV 6A."

Deficiency of the DMEIR Regarding Analysis of Conflicts with City and JPA San Dieguito River Valley Land Use Goals:

The DMEIR finds no conflicts with the adopted goals for the Gonzales Canyon/San Dieguito River Valley in both the "San Dieguito River Regional Plan" or JPA-adopted goals in the park "Concept Plan "Both Plan[s] would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon. Therefore, they are considered consistent with the goals and objectives of the FPA." [Table S-1]

How can the DMEIR consider only one—trails—of numerous SDRV goals in its analysis? The overriding conservation goals are not even considered in the summary of impacts. Doesn't this treat the SDRV as a mere trail system? How can the finding be made that this project would not "result in a conflict with the purpose and intent of any current planning policies or adopted environmental plans or policies " regarding the SDRV? This section needs to be corrected even in summary form to assess the effects on the river valley as the regional habitat system.

[60] Council Policy 600-40 requires conformance with the City's environmentally sensitive lands actions and cannot be seen to be met with this DMEIR.

> "Council Policy 600-40 (serves to) (2) ensure protection of environmental resources by preserving contiguous open space systems and (3) ensure that adopted land use policies and objectives are considered which enables decision makers to determine the consistency of the plan with RPO and other adopted General plan and City Council policies and objectives." [p. 13]

Roadway Under Roadways In and Adjacent to SA III

[61] The City of San Diego MSCP Subarea Plan "Preserve Guidelines" in the NCFUA include "(13. If funds become available, place a bridge culvert or bridge undercrossing for wildlife movement where El Camino Real crosses the outlet of Gonzales Canyon into the San Dieguito River." [p. 28] However, the DMEIR is inconsistent on whether bridges or culverts are proposed and ambiguous regarding actual provision.

> "In order to facilitate wildlife movement, a bridge on Del Mar Heights Road would be proposed over the north-south MSCP open space corridor just west of its intersection with Carmel Valley Road." [p. 54] In the next statement, "As with Del Mar Heights Road, a bridge would be provided on Camino Santa Fe south of SR-56 to allow east-west wildlife movement within the MSCP corridor."

Elsewhere, "Undercrossings (i.e., wildlife culverts) would be proposed beneath SR-56 and Del Mar Heights to facilitate wildlife movement."

The final MEIR should clarify exactly what is proposed and how it is to be funded.

Response

[60] A discussion of the project's consistency with Council Policy 600-40 is provided in the Land Use section of the MEIR.

[61] See response 3 in the letter of comment from the USFWS/CDFG. The final MEIR has been revised to clarify the location of bridges and culverts within Subarea III.

Neighborhood 10 Component

Discretionary actions include precise plan and community plan amendments to remove "approximately 9.1 acres of Tier II and Tier III habitats" from the MHPA within (N 10, p. 29) to add approximately 22 single-family units "and an increase in the number of multi-family units from 98-250." (S-17) all within Plan Area 10 of the neighborhood plan. This would add a total of 174 dwelling units to N 10, however, the "Traffic Circulation" analysis shows an additional 15 multi family units to the 174, raising two questions:

I62 (1) where are the additional 15 multi-family units shown?

(2) what is the basis for reducing the trip generation for multi-family units from 8 to 6 trips/unit? Is this analysis given the number of cars per resident in shared attached housing units? The DMEIR reasons this increase would produce "no net change in roadway impacts" because the additional units "would be offset by a reduction in units permitted in [N 8A], if development were permitted."

I63 The community traffic circulation scenario at Carmel Mountain Road along N's 10 & 8A and the analysis of E. Carmel Road-S are determined to be at LOS D or F at most intersections according to the final EIRs for N 10 Sorrento Valley, etc. Is the DMEIR saying that will remain the case, that "no net change" in these intersections will require the same queue lines and a.m. and p.m. delays, even with the proposed revised phasing plan (p. 1530)?

We appreciate the opportunity to comment and your attention to these issues.

Jan Fuchs, Chair

Dean Turkay, Vice-Chair

Response

I62 Trip generation rates used in the preparation of the traffic analysis were based on the city of San Diego trip generation summary. The trip generation rate for multi-family units with a density less than 20 dwelling units per acre is eight trips per unit. When the density for multi-family units is more than 20 dwelling units per acre a standard city rate of six trips per unit is used.

I63 The phasing plan analysis for Carmel Valley Neighborhood 10 and 8A both assume access via Carmel Country Road with no westerly connection to Carmel Mountain Road. If dwelling units in 8A are transferred to Neighborhood 10, the same access route is assumed. Therefore, impacts to Carmel Mountain Road and El Camino Real to the west are avoided.

RANCHO BERNARDO COMMUNITY PLANNING BOARD
P.O. BOX 289008
SAN DIEGO, CA 92198 9008

May 18, 1998

Mr. Robert Leiter
City of San Diego Development Services
1222 First Avenue, MS 501
San Diego, CA 92101

RE: COMMENTS TO THE SUBAREA III PLAN DRAFT EIR

Dear Mr. Leiter:

The Rancho Bernardo Community Planning Board has reviewed the draft EIR for the Subarea III Plan for the primary purpose of understanding the level of impact the project could have on the regional transportation system. As a result, the Board's concern regarding the adequacy and accuracy of the draft EIR is limited to the issue of traffic circulation.

Page 150 of the draft EIR states that needed improvements to I-5 and I-15 are the responsibility of "others," and although the project would result in significant cumulative impacts to these regional transportation facilities, mitigation is "outside the scope of the project." The Subarea III proposal is just one of seven development proposals located south of Del Mar Heights Highway between I-5 and I-15 that have either recently been approved or are
164 currently under consideration. The various EIRs prepared for these projects all indicate that mitigation for significant impacts to the freeways is beyond the scope of the individual projects. According to the Subarea I draft EIR, the total trip generation from these projects is 312,409 trips (Table 4B-7). If the individual projects being developed in the North City area are not responsible for mitigating their fair share of impacts to the regional transportation system, then who are the "others" that are responsible for mitigating the impacts for 312,409 additional trips on the road? When all of these projects are considered as a whole, it is obvious that the proposed development will greatly impact I-5 and I-15, yet none of these projects appear to have any responsibility for mitigating this impact.

The purpose of the cumulative impacts section of an EIR should not be to simply identify the cumulative impacts. The analysis should also recommend appropriate measures for minimizing these impacts, and identifying those parties responsible for implementing the mitigation measures.

Thank you for the opportunity to comment on this draft EIR.

Sincerely,

Richard Bolger
Planning Board Chair

Response

164. Specific improvements to I-5 and I-15 are shown on Table 24 of the traffic report. Four state construction are required for SR-56, I-5/SR-56 northbound connectors, and I-5/SR-56 improvements. In addition, regional improvements of I-5 and I-15 are required before buildout of Subarea III (Table 21 of the traffic report). Also, Subarea IV and 4S Ranch all have phased improvements for I-15.

Rancho Santa Fe Association
[illegible]
(858) 756-1131
[illegible]

MAY 12 2008

Eileen Lower, Environmental Planner
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Subject: Comments on the Draft Master Environmental Impact Report for Pacific Highlands Ranch (FEA Subarea III) Subarea Plan

Dear Ms. Lower:

Thank you for the opportunity to review and comment on the Draft MEIR for Pacific Highlands Ranch (FEA Subarea III) Subarea Plan. The Association is concerned about the potential impacts of the proposed development on traffic within the Covenant area.

1. The Association has concluded that the traffic analysis is inadequate and/or in error with respect to One (1) or Two (2) road segments and requests that further analysis of these segments be undertaken.

165 • El Apajo - Via de Santa Fe to San Dieguito Rd: This segment of road which exists as a 2-lane Collector with a LOS of "D" is projected to increase in ADTs from its 15,000 to 15,400 and operate at a LOS of "E". This is a significant increase in ADTs which should be addressed in further detail and mitigated.

166 • El Camino Real - San Dieguito Rd to Via de la Valle: This 2-lane Collector segment of road is stated to currently operate at a LOS of "F" accommodating 14,900 ADTs. According to Table 4(b)-9 of the MEIR "Subarea Plan Future Street Segments Level of Service," this segment is projected to increase to 28,900 ADTs and remain as a Collector albeit operating at an elevated and extremely unacceptable LOS of "F". Table 4(b)-11

Response

165. See response 144 to the Pacific Ranch Association letter of comment.

166. Table 9, Table 12, and Table 15 of the traffic study have been revised to show El Camino Real from San Andres Drive to Via de la Valle as a four-lane major. This is consistent with the transportation improvement summary Table 24 of the traffic study. The Final MEIR has been updated to reflect these traffic study changes.

"Transportation Improvement Summary," however, states that El Camino Real between San Andres Drive and Via de la Valle is to be improved to four lanes. This contradiction should be addressed. In addition, the projected increase in ADTs along this segment of road is of great concern to the Association and should be addressed in further detail and mitigated appropriately.

167 • Via de Santa Fe - Via de la Valle to El Apajo. This segment of road which exists as a 2-lane Collector with a LOS of "C" is projected to increase in ADTs from 6,900 to 12,900 and operate at a LOS of "F". This increase in ADTs is not addressed at all in the MEIR. It needs to be addressed and mitigated.

168 • Via de la Valle - El Camino Real to Via de Santa Fe. This segment of road which exists as a 2 lane Collector with a LOS of "F" and an estimated 26,100 ADTs is projected to decrease in ADTs to 25,900. It is also stated on Table 48-9 that this segment is to be improved to a 4-lane Major road with a LOS of "C". The Association adamantly opposes such an improvement which would destroy the rural, narrow character of the a historic roadways. Association staff, however, were informed by City staff that this segment of Via de la Valle should not be identified as proposed for improvement to four lanes and would actually remain a 2-lane Collector road with a LOS of "F." Table 48-9 needs to be corrected appropriately. Furthermore, although the future ADTs for this segment of road is projected to decrease from the existing count as a result of the construction of SR56 and other proposed roads within the region, the segment will continue to operate at a LOS of "F." According to City staff, the projected amount of traffic attributable to the Pacific Highlands Ranch project on this segment of road will be approximately 156 ADTs and does not constitute a "significant impact." However, any increase in traffic on a road which already operates at a LOS of "F" is considered significant by the Association. The Association requests that the increases in traffic on that segment of road be addressed in more detail and mitigated.

169 • El Camino Real from Via de la Valle to Lunas de Cielo. There is no analysis of this road segment included in the MEIR. The Association is concerned that this segment of roadway will be negatively impacted by the proposed development. It is already a highly traveled road.

170 Most state of the SCAG development proposals and adjacent development proposals within the unincorporated County areas are included in traffic analysis. While a number of the ongoing developments in the region were mentioned in the MEIR, the Association feels it is extremely important to include all current proposals and the most up-to-date information available for the traffic analysis. The Association has reviewed SANDAG's population estimates for the San Dieguito Planning Area and the larger mid North County region and they appear to be seriously flawed (see attachment). The Association questions the accuracy of ADT projections and traffic analysis based on these SANDAG population estimates. The ADT projections for the mid-North County area need to be recalculated based on existing entitlements so that reasonably accurate cumulative impacts can be assessed. In reviewing the MEIR, it was noted in particular that there was no mention of the on-going processing of Phase II of Black Mountain Ranch (Subarea I) which is to have 4,279 dwelling units and 650,000 sq. ft. of retail, service, office and employment centers. The Association is also aware of the on-going processing of the proposed Rancho Santa Fe Driving Range (which

Response

167. As shown on Table 20 of the traffic study the project will contribute only 342 trips of the projected ADTs. See also response 1 to Fairbanks Ranch Association letter of comment.

168. Table 9, Table 13, and Table 15 of the traffic study have been revised to show Via de la Valle from El Camino Real to Via de Santa Fe as a two lane collector. Comment noted regarding the significance of the project impact. The analysis was completed according to City procedures. Mitigation is tied to significant impacts. No significant impacts to the referenced roadway were identified, therefore, no mitigation is required.

169. The project study area was determined by both the City of San Diego and CMP guidelines. Based on the guidelines El Camino Real from Via de la Valle to Lunas de Cielo was not included in the project study area. A review of the forecast project distribution showed only 30 project related trips are projected on this segment. Therefore, mitigation discussion is not warranted.

170. The computer travel forecast prepared for the traffic analysis does include the cumulative projects. The travel forecasts assumed Phase II of Black Mountain Ranch along with Subarea's IV and V, and the county projects 4S Ranch and Santa Fe Valley Projects. Morgan Run and the driving range projects should also address cumulative traffic impacts and mitigation.

includes a driving range and a roller hockey complex) and the MHP modification for expansion of the Morgan Run Resort and Club. Traffic impacts of all these developments, if approved, will be enormous. EIRs and the review process for each of these individual projects should address the cumulative impacts of all these projects in order to provide traffic protections that are accurate.

171 The traffic analyses identifies Rancho Santa Fe as one of four county communities that will be "potentially affected by project traffic." The following three road segments in the county are discussed and analyzed:

- Camino Ruiz south of San Dieguito Road,
- El Apajo to Rancho Diegueno in San Dieguito east of El Camino Real, and
- Rancho Santa Fe Farms north of Calle Del Mesa.

The MEIR then summarizes that "Most of the traffic [in the four identified county communities] represents trips that originate in county areas and have destinations within the project area such as persons living in the county who visit friends in the project area. Because the resulting LOS for all three segments will be LOS D or better, they is not considered a significant effect" (p. 140, MEIR).

172 Given the above identified road segments and associated comments, this section of the MEIR is inadequate. It is unclear why the county portions of Via de la Valle between El Camino Real and Via de Santa Fe and Via De Santa Fe between Via de la Valle and El Apajo as well as the other county segments noted above are not identified and or discussed in greater detail in the "County Areas" impacts section (DRAFT MEIR, p. 140). The identified segments of Via De la Valle and Via de Santa Fe are already operating at a LOS of "F." Any impact to these road segments is also significant. Analyses of impacts on El Camino Real between Via de la Valle to Lunga de Circle also should be discussed in this section.

4 The Association requests that the proposed land uses be carefully reviewed with respect to conformance with that which was approved in the Framework Plan for Subarea III and with respect to the consistency of the proposed uses within various sections of the MEIR. The following errors and issues of concern were specifically identified:

- The MEIR states that 20 acres of land are to be used for "Employment Centers." There seems to be no discussion of this use in the Framework Plan.
- The proposed "Employment Centers" do not seem to be included in Table 4B-8 "Proposed Project Trip Generation."
- Table 4B-8 identifies that 550 "multi-family units are to be developed under the Subarea Plan Heading.

5 Based on the lack of our existing or planned regional mid-North County highway network, the
173 Association feels that no development within Subarea III should occur until all proposed circulation elements and required transportation mitigation measures associated with the proposed project are completed. In particular, the Association is opposed to the approval of any vehicle developments in the mid-North County area until SR56 is completed and with a corridor and ramps from SR56 onto Interstate 5 is planned, funded and completely constructed.

Response

171 See responses 166-168 above.

172 The proposed Employment Center land use designation, while not specifically described in the Framework Plan is was developed for Subarea III in cooperation with the project applicant and City staff to provide employment opportunities in close proximity to the residences. The trip generation for the Employment Center is within the "Office" use shown in Table 4B-8 and the table has been revised to correct the number of multi family units for Subarea Plan I.

173 The planned regional highway network that presently exists is reflected in the city, the City Framework Plan, and County General Plan circulation elements and amendments thereto. Projects are phased as the circulation elements are implemented. It would be improper as public policy to built all development until the plans are fully implemented because the projects provide both funds and right-of way to implement the infrastructure. Subarea III is carefully phased so that traffic impacts are avoided or mitigated. The SR-56/I-5 north direct connectors are not needed before development in Subarea III because the current ramps project to and from the south, which is about to be opened by Caltrans, will add significant new capacity to the system that diverting traffic from the existing Carmel Valley Road interchange and allowing new Subarea III traffic to be accommodated.

It is stated on page 143 of the DRAFT MEIR that State Transportation Implementation Plan (STIP) funding, design and award of a construction contract for the I-5/SR56 north direct connectors are assumed in order to begin Phase F of outlined Subarea III Phasing Plan. The actual completion of I-5/SR56 north direct connectors are not required until 7,150 of the total approximately 9,000 dwelling units are allowed to be constructed. The beginning of Phase F would allow for the construction of 1,500 dwelling units and 650 units are provided for previously in Phase D. The remaining build-out of Subarea III is proposed to be constructed after the I-5/SR56 north direct connectors are opened to traffic. Traffic congestion in the mid-North County area is already problematic and steadily worsening. Phasing plans for large scale developments in this region should provide that adequate vehicular circulation systems are in place and operational before the construction of new dwelling units and other traffic generating land uses are permitted. The proposed phasing plan for Pacific Highlands Ranch does not.

17.1a In summary, the Association requests that the Draft MEIR be carefully reviewed for consistency and adequacy with respect to traffic and circulation issues. Further, the Association requests that the EIR provide a more thorough analysis of the projected traffic on the roads which are adjacent to or within the Covenant area and are impacted to any significant (meaning change in LOS or significant increase in current V/C ratio) extent by the proposed development. The Association is extremely concerned about the continuous permitting of development within the mid-North County region without the prior completion of adequate traffic and circulation mitigations. It is hoped that the City and other permitting agencies will work to ensure that adequate traffic analysis and mitigation measures which protect the narrow, winding and heavily landscaped character of Rancho Santa Fe's rural roadways are undertaken before this and any future large-scale developments are approved.

Please keep us informed of staff recommendations and hearing dates.

The Association thanks you for your assistance, cooperation and for providing us with the opportunity to participate in this process.

Sincerely,

Pete Smith, Association Manager

Attachment: "Development Projects within the Rancho Santa Fe Region" (population and development estimate tables prepared by the Rancho Santa Fe Association).

cc: Supervisor Pam Slater
Chris Jones, Chair, San Dieguito Planning Group

Response

17.1a The traffic analysis presented traffic technical report and summarized in the body of the MEIR provides a thorough discussion of the proposed project's cumulative impacts on projected traffic volumes on roads in the vicinity. The final traffic analysis for the Subarea III Plan is included as an appendix to the final MEIR.

Development Projects within the Rancho Santa Fe Region

Disclaimer: These tables contain data from active planning projects in various stages of the planning and approval process. Data is approximate and subject to change without notification.

CITY OF SAN DIEGO

Project Name	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
Black Mountain Ranch II - Phase I (FUA - Subarea II	3,777	1,119	• 2 Schools • 2 Churches • 2 Golf Courses • Community Park	14,402	3,301
Source: Black Mountain Ranch Revised TM					
Black Mountain Ranch II - Phase II (FUA - Subarea II)	900	4,281	• Retail & Services (135,000 sq. ft.) • Office (65,000 sq. ft.) • Employment Centers (450,000 sq. ft.)	60,310	12,829
Source: Preliminary Trip Calculations for Subareas 1A and 1B after Subarea V; Black Mountain Ranch Revised TM Phase I proposed uses					
Subarea II - FUA	830	230	NONE	2,300	679
Source: Hamptons Plan					
Subarea III - FUA (excluding Sea Breeze Farms)	2,668	3,016 • Single-Family (1,243) • Multi-Family (1,773)	• Park (30 acres) • Elementary School (20 acres) • High Schools (45 acres) • Private High School (50 acres) • Neighborhood Commercial (150 KSF) • Office (150 KSF + 14 acres) • Civic (4 acres)	30,689	14,797
Source: DRAFT Master Environmental Impact Report for Pacific Highlands Ranch (Subarea III), dated April 3, 1998					
Sea Breeze Farms (annexed into Carmel Valley Community Plan)	72	300 • Single Family (250) • Multi Family (50)	NONE	3,060	885
Source: 4 S Ranch Draft EIR					
Torrey Highlands (FUA - Subarea IV)	1,134	2,500	• Employment Center • Joint Operations Center • Institutional • Commercial • Schools • Parks	57,152	7,670
Source: Torrey Highlands Subarea IV EIR					

Page 1

PR-67

Response

Development Projects within the Rancho Santa Fe Region

Assumes: These tables contain data from the development projects in various stages of the planning and approval process. All data is approximate and subject to additional interpretation.

Artpenke Highlands FUA - Subarea VI	387	93	• Lands needed to City for school	2,130	274
Source: Torrey Highlands Subarea IV EIR					
Del Mar Mesa Specific Plan FUA - Subarea VI	1,802 (130 acres of which are outside of Subarea VI)	888	• Resort • Golf course • School • Park	10,670	2,030
Source: Del Mar Mesa Subarea V FEIR and Supplemental Final EIR					
Rougainvillea FUA - Subarea VI	240	134	• Resort • Golf course	4,340	395
Source: Rougainvillea Final EIR					
Area Total	11,710	14,461		234,853	42,680

CITY OF ENCINITAS

Project Name	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
Gaines Bridge - Barnett	148	58	NONE	580	151
Source: City of Encinitas Parcel Map, Personal Communication with City of Encinitas Planning Staff, 7/19/95					
Wildflower Estates	73	31	NONE	340	81
Source: City of Encinitas Parcel Map, Personal Communication with City of Encinitas Planning Staff, 7/19/95					
Double L Ranch	97	36	NONE	360	94
Source: City of Encinitas Parcel Map, Personal Communication with City of Encinitas Planning Staff, 10/95					
Area Total	318	125	NONE	1,250	326

PR-88-2

Page 2

Response

Development Projects within the Rancho Santa Fe Region

Remember: These tables contain data from projects in various stages of the planning and approval process. All data is approximate and subject to change prior to construction.

CITY OF CARLSBAD

Project Name	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
The Villages of La Costa (Approved Southwest Area)	529	1,076 • Single-Family	• Jr. High School (27.40 acres) • Elementary School (13.30 acres) • Church (7.60 acre) • Open Space/Recreation • RV Storage/Dog Facility	12,882	2,690
Source: The Villages of La Costa Master Plan, Personal Communication with Fred Arbolino.					
The Villages of La Costa (Proposed Southeast Area)	1,121	1,152	?	11,520	2,830
Source: Personal Communication, City of Carlsbad Planning Staff (1-19-96)					
The Villages of La Costa (Proposed Northwest Area)	744	1,149	?	11,490	2,873
Source: Personal Communication, City of Carlsbad Planning Staff (1-19-96)					
Green Valley	281	460 max. • Single-Family	• Community Commercial/Retail • Open Space (18.3 acres total)	18,810	1,000
Source: Green Valley Master Plan and Personal Communication, City of Carlsbad Planning Staff (1-19-96 & 1-19-96)					
Shelley Tract	200	249 • Single-Family	• Elementary School (Existing) • Open Space (Approx. 10 acres total)	2,490	623
Source: Rancho Cabrillo Master Plan, Personal Communication, City of Carlsbad Planning Staff (1-19-96 & 1-19-96)					
Rancho Cabrillo	405	1,814 • Single Family (1,067) • Multi-Family (749)	• School (17.1 acres) • Community Facilities (4.5 acres) • Open Space (252.2 acres)	17,080	4,640
Source: Rancho Cabrillo Master Plan, Personal Communication, City of Carlsbad Planning Staff (1-19-96 & 1-19-96)					
Area Total	3,280	5,822		72,680	14,556

PR-6.3

Page 1

Background

Development Projects within the Rancho Santa Fe Region

Disclaimer: These tables contain data from development projects at various stages of the planning and approval process. All data is approximate and subject to change at the discretion of the agency.

CITY OF SAN MARCOS

Project Name	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
San Elijo Ranch	1,981	3,021 • Single-Family (2,135) • Estate (135) • Multi-Family (272) • Cluster/Attached (460) • Patio Home (319)	• Neighborhood Comm. (13 acres) • Elementary Schools (26 acres) • Institutional (9 acres) • Regional Rec. Park (200 acres) • Neighborhood Park (20 acres) • Open Space (777 acres) • Water Reservoir, Sheriff Substation, Fire Station (Minimal acreage)	46,264	10,029
Source: San Elijo Ranch Specific Plan Amendment, November [illegible] 1990					
University Commons	416	1,704 • Single-Family (490) • Multi-Family (1,214)	• Neighborhood Comm. (13.6 acres) • Elementary School (12.8 acres) • Park (24 acres) • Open Space (71.5 acres)	25,020	5,146
Source: University Commons Specific Plan, September 24, 1991, Revised November [illegible] 1991					
Area Total	2,377	5,026		71,284	15,175

Development Projects within the Rancho Santa Fe Region

Disclaimer: These tables contain data from development projects at various stages of the planning and approval process. All data is approximate and subject to jurisdictional modification.

COUNTY OF SAN DIEGO

Project Name	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
4-S Ranch	3,525	4,955	• Schools • Parks • Office • Community Facility • Commercial • Churches • Fire Station • Transit	52,950	16,847
Source: 4-S Ranch Draft EIR					
Christopherhill (part of 4S Ranch SPA)	634	400 • Single-Family (300) • Multi-Family (100)	• Commercial (4 Acres)	5,800	1,180
Source: 4-S Ranch Draft EIR					
Rancho Cielo Specific Plan	2,815	770	• Neighborhood Commercial & Retail (50,000 sq. ft.)	8,920	2,272
Source: Personal Conversation with Dave Decus, Rancho Cielo, 12-2-97					
Cielo at Rancho Santa Fe (part of Rancho Cielo SPA)	1,700	327	• Neighborhood Commercial & Retail (up to 50,000 sq. ft.)	6,661	1,565
Source: Personal Conversation with Dave Decus, Rancho Cielo, 12-2-97					
Santa Fe Creek (part of Rancho Cielo SPA)	195	45 (5 of 45 are with Rancho Cielo SPA)	NONE	480	1,328
Source: Personal Conversation with Dave Decus, Rancho Cielo, 12-2-97					

Page 1

PR-98

Repose

Development Projects within the Rancho Santa Fe Region

Disclaimer: These tables contain data from various development projects in various stages of the planning and approval process. All data is approximate and is subject to additional modification.

Santa Fe Valley Specific Plan	3,161	1,200 • Single Family • Multi Family	• Golf Course (18 holes) • Executive Golf Course (9 holes) • Resort hotel (250 rooms/26 acres) • Private Equestrian Facility (?) • Congregate Care Facility (7 acres) • Neighborhood Commercial (12 acres) • Elementary School (1-7 acres) • Fire Station (8 acres) • Sewage Treatment Plant (2.7 acres) • Park	21,355	3,540
Source: 4-5 March Draft EIR Santa Fe Valley Specific Plan Draft EIR					
Santa Fe Hills	80	15	NONE	150	44
Source: 4-5 March Draft EIR					
Horizon Country Club	440	180	• Private Golf Course	3,200	716
Source: 4-5 March Draft EIR					
Area Total	10,623	7,600		122,185	24,421

	Total Acreage	No. of Residential Dwelling Units	Other Land Uses	Total Estimated ADT's	Total Estimated Population
Regional Total	28,308	32,908		601,102	98,612

Notes:

- When not provided in source documents cited above, ADT calculations were estimated by using the "Not So Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region" San Diego Association of Governments, December 1996
- Total population estimates were calculated using the January '... '097 persons per household calculation factors provided in "Table 15. Persons per Household By Jurisdiction", *SANDAG Info*, SANDAG/Source Point, September- October 1997, p 15
- Not included in these estimates are the planned and potential minor subdivisions in the region that will increase these estimates by some unknown but cumulatively significant factor
- Prepared By: Rancho Santa Fe Association January 1998
- Edited Date: Edited to reflect updated numbers and uses for Subarea III - Pacific Highlands Ranch on April 9, 1998

Page 6

PR-86

Response

SANTA FE SUB
HOMEOWNERS ASSOCIATION
P.O. Box 9030-309
Carlsbad, California 92009
(760)631-3990 * (760)631-3942 (fax)

RECEIVED
MAY 1 8 1998

May 15, 1998

City of San Diego
Development Services Business Center
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Attention: Robert Lower, Environmental Planner

Subject: Response to Draft Master Environmental Impact Report (MEIR) Subarea III Plan in the North City Future Urbanizing Area (NCFUA) (LDR No. 96-7918)

Dear Ms. Lower:

Santa Fe Sub is a residential community which borders the northeast area of Subarea III. We are very concerned with traffic and density issues involved in the Draft MEIR which directly affects our community. Rancho Santa Fe Farms Road runs right through our community. We are submitting the following comments in hopes that they will be incorporated in the analysis of the Final MEIR.

As mentioned above, Rancho Santa Fe Farms Road runs right through our community. It is a two lane residential street. There are no sidewalks on Rancho Santa Fe Farms Road. A number of the driveways in our community empty out directly into Rancho Santa Fe Farms Road. Four streets in our community require residents to turn on Rancho Santa Fe Farms Road. In figures 4B-1 and 4B-2, the Draft MEIR shown the average daily traffic volume on Rancho Santa Fe Farms Road is projected to increase approximately 200% as a result of the subarea plan; from the current 2,000 vehicles to 9900 vehicles. The
174 street is crossed by adults, children, horses and their riders, dogs, and a variety of wildlife. We have already had a number of serious accidents on Rancho Santa Fe Farms Road, and the claim on page 140 of the Draft MEIR that the increase in traffic is "not considered a significant effect" defies reality and reason.

175 There is no question that the Subarea III plan as set forth in the Draft MEIR does not adequately address the impact of increased traffic on Rancho Santa Fe Farms

Response

174 See response 70 to letter from County of San Diego (Doug Isbell).

175. See response 70 to letter from County of San Diego (Doug Isbell).

Response

Road, and the impacts on our community and the surrounding communities with respect to public safety concerns, noise, and the nature of the community.

We hope that our concerns will be seriously considered and addressed in the Final Subarea III Plan MEIR. We would appreciate a copy of the Final MEIR sent to the above address as soon as it is available for public review. Thank you for your cooperation in this matter.

Sincerely,

Alex Landon
President, Santa Fe Star Homeowners Association

May 16, 1998

RECEIVED

To: Eileen Lowet
Environmental Planner

From: Lloyd Sappington, President
Rancho Glens Estates Homeowners Association

RE: Response to Draft Environmental Impact Report
Pacific Highlands Ranch (Subarea III) Subarea Plan (NCFUA)
EDR No. 96-7918 SCH No. 97111077

176 Subarea Plan 1 (SR-56 Alignment "F") and Subarea Plan 2 (SR-56 Alignment "G") are completely unacceptable to Rancho Glens Estates since they are based on freeway alignments north of Santa Monica Ridge. Such alignments violate the City of San Diego's 1992 Framework Plan for the North City Future Urbanizing Area, adopted as part of the City's General Plan. They are devastating to those communities already existing in Subarea III and will be devastating to any communities developed here in the future. Compared with the alignments proposed south of the Santa Monica Ridge, these northern routes are longer, translating into more commuter miles traveled and more air pollution. They are less direct and will be more costly to build. They are seriously flawed from a land use perspective. Moreover, if built, they will forever have a deleterious effect on the health, safety, and welfare of the people living in NCFUA.

177 By contrast, the Central Alignment "would avoid all built land uses," "would not result in significant community character impacts," and "would be consistent with the general land use plan for Subarea III of the Framework Plan" *(Draft Revised Environmental Impact Report, EDR NO. 95-0099 SCH NO. 96031039, pp. 5.5-17, 18).*

178 As to the process employed by the applicant in developing these plans for Pacific Highlands Ranch, Rancho Glens Estates was not consulted nor were we considered. The applicant did not meet with Rancho Glens Estates to discuss its plans until May 13, 1998. As a result, it is impossible for us to

Response

176 Comments acknowledged. It should be noted that the Central SR-56 alignment alternative would result in significant unmitigated impacts in several environmental issue areas, including land use, MSCP consistency, landform alteration, visual quality, and biological resources.

177 Comments acknowledged. It should be noted that the Central SR-56 alignment alternative would result in significant unmitigated impacts in several environmental issue areas, including land use, MSCP consistency, landform alteration, visual quality, and biological resources.

178 As required, the Pacific Highlands Ranch Land Use Plan reflects the guiding principals of the Adopted Framework Plan. The Plan includes an open space system which is consistent with both the Framework Plan and the MHPA. The Plan includes a mixed use community core, located at the center of the project and a variety of housing types as dictated by the Framework Plan. The Plan also includes four different land plans reflecting the various SR-56 alternative alignments. Representatives of the Rancho Glens Estates attended and provided comments at several Carmel Valley community workshops during the months of April and May, a Planning Commission workshop on April 30, 1998, and also met with Pardee Construction Company representatives on February 9, 1998, and May 13, 1998.

make a thorough and studied response by the May 18, 1998 deadline. The applicant's approach shows total disregard for the concerns of Rancho Glens Estates and the impact these plans would have on our community. It is very clear that this process is broken, and we intend to hold the City accountable for any failure to ensure that Rancho Glens Estates receives proper opportunity to review the applicant's plans and a realistic timeframe in which to comment on their impact on our community.

179 In addition to placing a freeway at our front door, the Pacific Highlands Ranch Subarea III plans surround Rancho Glens with density and use that is inconsistent with our standing as a 1 per 4 development of estate homes. Furthermore, the plans represent the applicant's intention to actually enter our community, a Planned Residential Development, with walking, biking, and horseback riding trails.

In terms of the plans' suitability for the development of Subarea III, Rancho Glens Estates has the following concerns:

1. The Pacific Highlands Ranch Subarea Plan violates the City's General
180 Plan goals of retaining premium farm land and of developing a transportation system that is consistent with the types of land uses that it serves.
2. The PFIRS Plan violates the City's MCPUA Framework Plan's guiding
181 principle of designing a transportation system that will not result in severe impacts to adjoining communities. Traffic generated by building out the PFIRS Plan would result in immediate and cumulative impacts on the I-5/805 and I-15 freeways as well as on surface streets within and outside of the subarea.

Given that the City of San Diego is already experiencing enormous traffic problems on these two north/south freeways, it does not make sense to build out the subarea, with all of the additional traffic that that build-out will generate, without first solving the traffic problems we are experiencing today. To do so would place an unnecessary burden on the citizens of this city.

Moreover, the density increase proposed in the Pacific Highlands Ranch Subarea Plan is simply inappropriate for this area. The applicant for Pacific Highlands Ranch intends to build out Subarea III with over 5,000 dwelling

Response

179 Under both Subarea Plans, the proposed land uses adjacent to the Rancho Glens Estates residential community (i.e., MHPA open space on the south, west, and east with residential to the north) would not be considered incompatible with the site. Rancho Glens Estates was developed utilizing the cluster option specified by the City of San Diego's Municipal Code. This option allows development of one unit per four acres in the AG 10 zone of the Future Urbanizing area, with the permitted units clustered. The prior existence of Rancho Glens Estates does not preclude development of the surrounding areas at the higher densities that could occur with a phase shift. The comment on the proposed Subarea Plan trail and the existing Rancho Glens Estates PRD is acknowledged.

180. The effect of the proposed Subarea Plans for Pacific Highlands Ranch with respect to agricultural lands is acknowledged in the MEIR as a significant unmitigated direct and cumulative effect of the project.

181. The MEIR addresses cumulative traffic impacts and acknowledges that the project would contribute to cumulative traffic impacts in the region.

units, nearly 10 times the density proposed in the concept plans for Subarea
182 III that can be implemented without a phase shift. These plans call for one unit per four acres on Parker-owned land, with one unit per ten acres on the other ownerships. These plans would result in 551 dwelling units, a golf course, driving range, clubhouse, and school park. Rancho Glens Estates encourages the applicant to consider a build out of this character instead.

Finally, Rancho Glens Estates is a member of San Diegans for Responsible Freeway Planning. We encourage the City to consider the remarks from this organization as well as those we have made here in evaluating the plans for Subarea III.

We thank you for this opportunity to comment.

Floyd Sappington Date

Response

182 This comment on the appropriateness of the proposed residential density for Pacific Highlands Ranch by the Association is noted. A phase shift would be required for the implementation of the proposed project.

San Diego River Valley
Regional Open Space Park
1600 Pacific Hwy, Suite 703
San Diego, CA 92101
(619) 235-1445 Fax (619) 235-1321
www.sdrp.org

RECEIVED

MAY 19 1998

ENVIRONMENTAL ANALYSIS SECTION

May 18, 1998

Ms. Eileen Lower
City of San Diego, Development Services
202 C Street, M.S. 501
San Diego, CA 92101

SUBJECT: Comments to the Pacific Highlands Ranch (Subarea II) Subarea Plan Draft Master Environmental Impact Report

Dear Ms. Lower:

The San Dieguito River Park Joint Powers Authority (JPA) appreciates the opportunity to review and comment on the adequacy and accuracy of the draft Master EIR for the Subarea II Plan. The JPA Board of Directors considered the Subarea II proposal at its meeting of May 15, 1998 at which time the following comments were approved:

1. The MHPA was established to preserve sensitive resources and provide for viable wildlife corridors and larger habitat areas. The design, configuration and total acres included within the MHPA boundaries were established based on what the resource agencies and other biologists believed would be necessary to maintain a viable habitat preserve in this area. In order to ensure the health of the biological resources within the western end of the San Dieguito River Valley, an adequate area of open space must be maintained within proposed wildlife linkages, particularly Gonzales Canyon. Although it is important to preserve the unique resources of the Del Mar Mesa, this preservation should not occur at the expense of another important biological area.

183 *Of particular concern is the modification being proposed to the area referred to as Area S on the attached map. The deletion of approximately 44 acres of proposed open space from the MHPA at this location would change the function of this area from that of a "refugia" for wildlife to a more narrow corridor. To ensure the viability of the open space in Gonzales Canyon, the original MHPA boundary should be maintained in this area.*

2. The trails illustrated in the Subarea Plan include key linkages between the San Dieguito River Park and Los Penasquitos Canyon Preserve. As designed, the proposed network of trails will not work.

Response

183 Comment noted. The viability of Gonzales Canyon will be maintained. It will have a maximum width of 1,800 feet and will still include a "refugium" of approximately 840 acres. The City of San Diego has found, and the USFWS and CDFG have concurred, on this point, and on the finding that the MHPA will be functionally equivalent to that originally adopted. See letter of comment from CDFG and USFWS above.

therefore, it is essential that these key linkages be retained in the plan and that measures

184 *for implementing the linkages be approved as part of the Development Agreement. A critical trail segment involves the previously approved Del Mar Highlands Estates project. That applicant did not object to inclusion of the trail in that project and the JPA Board requested that City to make the trail segment a condition of the project, but it was not required by the City at the time the project was approved. Because this linkage is shown on the Subarea Plan trails map, it is essential that the Subarea Plan text include language that assures the financing for and construction of the trail segment that extends through the previously approved Del Mar Highlands Estates project.*

The San Dieguito River Park JPA Board of Directors also requests that the San Diego City Council incorporate the following specific text into the Subarea Plan and proposed Development Agreement for Subarea II:

185 *1. As was required of the Del Mar Highlands Estates project, this project and all future development proposals located north of SR-56 shall contribute to the cost of constructing a wildlife undercrossing at El Camino Real in order to accommodate wildlife movement between Gonzales Canyon and the western river valley.*

186 *2. Permanent detention basins shall be provided within the subarea in order to minimize impacts to downstream water quality, and these facilities shall be constructed prior to the issuance of building permits.*

187 *4. The area of habitat restoration that the applicant is required to complete shall be expanded to include the "disked/grazed/mowed" areas within Gonzales Canyon and located immediately to the south of MHPA Adjustment Area 6. The additional acreage could be included in the mitigation bank to be operated by the developer.*

188 *4. In order to ensure the timely completion of the proposed trail system, all of the trails illustrated on the Subarea Plan shall be constructed by the developer in accordance with the City Parks and Recreation Department standards and shall be completed prior to dedication of open space to the City.*

The JPA action presented above forms the basis for the staff comments to the draft Master EIR (MEIR). However, it can not be stated that the staff comments provided below have not been reviewed or approved by the JPA Board of Directors.

Land Use

189 1. Page 78 - The MMFIR incorrectly states that "the City of San Diego has not yet incorporated any part of the concept plan into City planning documents, although several Framework Plan policies address the park." Significant elements of the San Dieguito River Park Concept Plan were incorporated into the San Pasqual Valley Plan, which was adopted by the San Diego City Council in 1995. In addition, the North City Future Urbanizing Area Framework Plan incorporates the Park concepts as presented in the Concept Plan. The Framework

Response

184 The Del Mar Highlands Estates project was approved in 1987 with associated conditions and plans. The adoption of the Pacific Highlands Ranch Subarea Plan will not modify conditions of the previously approved Del Mar Heights project, including the trail requirements. However, the multi-use trail located in the Gonzales Canyon linking portions of the San Dieguito River Park is included within the Pacific Highlands Ranch Public Facilities Financing Plan and Facility Benefit Assessment (PFFAB). Language describing the financing, costs, and timing of this and other trails is included within the PFFA documents.

185 See response 3 to the ESP/WSP/CBP/45 letter.

186 The two basins shown in the MEIR on pages 218 and 219 are conceptual. The precise location and sizing of detention basins to serve the Pacific Highlands Ranch Subarea Plan would be determined at the time tentative maps are proposed for the various communities within the Subarea. All detention basins would be designed to reduce direct hydrology and water quality impacts to below a level of significance.

187. This recommendation from the JPA board is noted.

188. This recommendation from the JPA board is noted.

189. Comment noted.

policies. Specifically, the Park's goals and objectives are incorporated into the Land Use, Urban Design, Open Space and Transportation chapters of the Framework Plan.

2. Page 93 - Although the SMHCIR accurately outlines the goal, objectives, and implementing principles of the River Park Concept Plan under existing conditions in the Land Use section, the impact discussion that addresses consistency of the project with the Concept
190 Plan omits its analysis to the single topic of trails. This analysis is not adequate as it fails to consider the project's consistency with the other goals and objectives established for these areas located within the Park's Targeted Planning Area such as the preservation and restoration of sensitive biological resources, the establishment of viable wildlife corridors, protection of downstream water quality and protection of visual quality. In addition, the River Park does not
191 consider if the current language included within the Subarea Plan provides adequate assurance that trails will ultimately be constructed within the subarea. As currently written, the subarea plan states that developer impact fees will be collected to pay for trails. The plan does not however provide any assurances that the trails will ultimately be constructed. For instance, how will the required trail easement be obtained along the western edge of the private high school. The subarea plan provides no direction or requirement to obtain a trail easement in association with the approval of future development plans for the school. In addition, no timetable for when the trail system should be developed is included in the subarea plan text. Unless more definitive language that is specifically coordinated with the permitting process as a prerequisite is included in the subarea plan text to ensure the timely construction of the trail system, it is not accurate to state that the Plan is consistent with the River Park goal of providing a connected trail system between Los Penasquitos Canyon and the San Dieguito River Valley. This inconsistency represents a significant land use impact that could be mitigated by including within the Development Agreement the requirement that all trails anticipated in the subarea plan, including the trail segment within Del Mar Highlands Estates, shall be constructed by the developer in accordance with City Parks and Recreation Department standards and shall be completed prior to the dedication of open space in the City.

192 Finally, as will be described in greater detail below, the River Park does not believe that the project, as currently proposed, is consistent with the goals to preserve and protect sensitive biological resources, establish a viable wildlife corridor or protect downstream water quality. Only if the project design is modified to maintain the original MHPA boundary in Area 6 and additional conditions related to trails, habitat restoration, permanent detention basins, and a wildlife undercrossing at El Camino Real are incorporated into the subarea plan and development agreement can the SMHCIR conclude that the project is consistent with the goals and objectives of the San Dieguito River Park Concept Plan.

Biological Resources

193 1. Page 187 - The impact discussion states that the project will result in the loss of a number of sensitive plant species. In order to facilitate on- and off-site revegetation projects, the subarea plan should recommend that prior to the commencement of any grading operations, the applicant should contact appropriate agencies and/or organizations, such as CNPS, regarding opportunities for plant salvage operations in areas designated for grading. Although not considered a

Response

190 See Response 159 in the Carmel Valley Community Planning Board letter.

191 The Pacific Highlands Ranch Subarea Plan has an extensive discussion with associated exhibits indicating the type and design of the proposed trail system. The project includes over 15 miles of trails and takes the commitment to have these built seriously. Based upon your comments, language will be added to the Plan which will require all projects at the time of discretionary approvals to submit a Trail Plan which includes details of the timing, easements, dedication, and financing of said trails. This condition would apply to all projects, including the proposed private high school.

192 This position from the JPA is noted.

193 Salvage of sensitive plant species as appropriate from development areas is a component of the conceptual revegetation plan prepared for the project. Any salvage efforts would be conducted by qualified biologists during implementation of the revegetation efforts.

mitigation measure, with a recommendation would benefit the regional goal of promoting successful habitat restoration.

194 2. Page 109. Although not presented as mitigation, the DMEIR refers in several places to the approximately 100 acres of disturbed land within the MHPA that would be restored by Pardee. The DMEIR should include a map indicating where these 100 acres of restored habitat would be located.

195 3. Page 203. The EPA disagrees with the statement that the proposed subarea plan would not impact wildlife movement within the Gonzales Canyon area. The MHPA was established to preserve sensitive resources and provide for viable wildlife corridors and larger habitat areas. The design, configuration and total acres included within the MHPA boundaries were established based on what the resource agencies and other experts believed would be necessary to maintain a viable habitat preserve in this area. In order to retain the health of the biological resources within the western end of the San Dieguito River Valley, an adequate area of open space must be maintained within proposed wildlife linkages, particularly Gonzales Canyon.

Of particular concern is the road alignment being proposed in the area referred to as Area 6. The relocation of approximately 44 acres of proposed open space from the MHPA at this location would change the function of this area from one of a nesting area for wildlife to a more narrow corridor. An appropriate mitigation measure for ensuring the viability of the open space in Gonzales Canyon would be to maintain the original MHPA boundary in this area.

The proposal to modify the MHPA boundary at Area 6 results in a reduction in the quality of the wildlife corridor. As stated above, this impact should be avoided by maintaining the original MHPA boundary, however, if the modification is approved, then the proposed area of habitat restoration described in the DMEIR should be expanded to include the disturbed/agricultural areas located immediately to the south of the MHPA Adjustment Area 6. This would provide additional vegetative cover to compensate for the reduction in overall corridor width.

196 Finally, with respect to the overall north-south wildlife corridor, both the DMEIR and the subarea plan explain that "the on-site open space system would ... provide a desired northerly linkage/wildlife corridor via a south-north tributary canyon to Gonzales Canyon. This north-south corridor is part of the regional wildlife preserve system ... Undercrossings are proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement" (page 32 of the draft MHSP). The report does not explain how wildlife can travel from Los Penasquitos Canyon to Gonzales Canyon; however, there is no discussion of how wildlife will travel from Gonzales Canyon to the San Dieguito River Valley. The City of San Diego MSCP Subarea Plan, includes the following guideline for the Future Urbanizing Area: "If funds become available, place a large culvert or bridge undercrossing for wildlife movement where El Camino Real crosses the outlet of Gonzales Canyon to the San Dieguito River" (page 2h). The development of Subarea III will alter the existing wildlife movement through the area by funneling all north-south movement between Los Penasquitos Canyon and the San Dieguito River Valley through Gonzales Canyon. Implementation of the project will also reduce the area available for foraging, shelter, and nesting. This represents a significant cumulative impact to overall wildlife habitat and wildlife

Response

194 See responses 9 and 10 to the letter of comment from the USFWS(1150).

195 This recommendation is acknowledged. See also the letter of comment from the USFWS(1184).

196 The referenced north-south wildlife corridor is within the Del Mar Highlands Estates project which was approved in 1998. The approval for Del Mar Highlands Estates included a north-south connection approximately 700-800 feet in width which would allow for movement between Gonzales Canyon and the San Dieguito River valley. As such, this connection is not a component of the proposed Subarea Plan for Pacific Highlands Ranch.

improvement. Mitigation for this impact is available in the form of contributions to the cost of constructing a wildlife undercrossing at El Camino Real. Such an undercrossing would permit wildlife to more easily enter the larger open areas available in the western river valley.

Hydrology/Water Quality

197 I Page 334 - Due to the extent of urban development proposed within the Subarea III planning area, there is considerable potential for significant downstream impacts to the San Dieguito coastal wetlands. To avoid or minimize such impacts, the proposed project should be required to construct and maintain permanent detention basins that will serve to capture silt, as well as reduce the quantity of urban pollutants that will leave the project site. The statement in the Mitigation Monitoring and Reporting section that "Current plans call for the construction of desilting basins in the subarea" is inaccurate. The draft subarea plan states on page B-1 that "detention facilities for erosion control may be required" and "detention, desilting water quality basins may be provided." If permanent detention basins are not specifically called out as required facilities within the subarea plan, then the Final EIR should identify significant, unmitigated impacts to downstream water quality as a result of project implementation.

Thank you for the opportunity to provide these comments. Please forward a copy of the final EIR and future public hearing notices to the River Park when they become available.

Sincerely,

Dick Blobaum
Executive Director

cc: JPA Board of Directors

Response

197. It is recognized that as tentative maps are processed within Subarea III, conditions of approval will require that permanent detention basins be implemented to minimize impacts to the Peñasquitos Lagoon. As described on page 224 of the draft MEIR, the exact number, size, design, and location of desilting/retention basins would be determined at the time tentative maps are processed. The locations of basins shown on Figures 4D-3 and 4D-4 are conceptual and would be refined as detailed grading studies are completed for specific development proposals. It should be noted that the MEIR identifies significant unmitigated cumulative downstream water quality impacts.

California Native Plant Society

San Diego Chapter P.O. Box 1390 San Diego, CA 92112

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MAY 19 1998

ENGINEERING

Eastern Lower
Environmental Planner
City of San Diego
1222 First Avenue, MS 501
San Diego, CA 92101

Re: Pacific Highlands Ranch (Subarea III) Subarea Plan
LDR No. 96-7918 SCH No. 97111077

Dear Ms. Lower,

The San Diego Chapter of the California Native Plant Society has reviewed the draft Master Environmental Impact Report for Pacific Highlands Ranch (Subarea III) Subarea Plan in the North City Future Urbanizing Area (NCFUA) General Plan Amendment, NCFUA Framework Plan Amendment, Subarea Plan, Master Rezone, Multiple Habitat Planning Area Boundary Adjustment, and Local Coastal Plan Amendment. We have a few minor questions concerning the project.

198 Why are highly invasive species being utilized in the landscape plan when the project is adjacent to MSCP preserve? Is this consistent with MSCP adjacency guidelines given that surface water will likely be funneled into the preserve?

199 We could find no discussion of significance of impacts to non-covered species. While we believe the open space dedication mitigates most impacts, there should be discussion for the various species in the document to explain why the impact is not significant or mitigated for each species.

200 Once again the preservation listed as present in Table 4C-2, we could not find the species mapped in Figure 4C-3. It is not clear if the species is already mitigated.

201 Given that the impact to Brewer's calandrinia (*Calandrinia breweri*) is to a single plant and the impact might be considered insignificant, we ask that our organization be given permission to salvage the plant.

If there are any questions or issues that need further clarification, please do not hesitate to contact me at (619) 421-5769.

Sincerely,

Cindy Burrascano

Response

198. The landscape palette presented in the Subarea Plan indicates that plantings adjacent to natural open space within the MSCP should be native and any native naturalized species should be non-invasive. All plantings adjacent to the MSCP open space would comply with the directives and management guidelines described in the City's MSCP Subarea Plan.

199. Impacts to sensitive species are addressed on pages 187 and 192. Mitigation for all sensitive species are discussed beginning on page 198. See also response 19 to the USFWS letter.

200. This species was not observed during the surveys of the site and Table 4C-2 has been revised in the final MEIR.

201. See response 158 in the San Dieguito River Valley Regional Open Space Park letter of comment.

Friends of Los Peñasquitos Canyon Preserve
P.O. Box 26523, San Diego, California 92196
619-484-3219 • 619-566-6489 • FAX: 619-271-1425

Response

May 16, 1998

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[illegible]
Environmental Planner
Development Services
Land Development Review Division
1222 First Ave., MS 501
San Diego, CA 92101

Re: MEIR for Pacific Highlands Ranch Subarea III.

1. Eighteen natives for revegetation are listed in the Biological Resource Assessment for Subarea III document. We question two of the plants listed for the "riparian/wetland mix." The first is *Lythrum hyssopifolia* (grass poly). 202 Although Beauchamp's *Flora of San Diego County* lists this as a native, the new *Jepson Manual: Higher Plants of California*, now the current flora standard, lists this plant as introduced, not a native. In fact, it is a native to Europe. There is a California Lythrum, *Lythrum Californicum* that occupies similar niches. The second plant is *Rhus integrifolia* (lemonadeberry). This is, of course, a wonderful native shrub. However, it is rarely found in riparian areas or wetlands. It is generally an upland species, especially in chaparral, but also in coastal sage scrub. Unlike the *Lythrum hyssopifolia*, which is invasive, the lemonadeberry won't do any harm, but is not appropriate for a wetlands seed mix.

2. The Draft Subarea Plan lists Landscape Palettes. We note that a number of highly invasive tree, shrub and other plant species are included in the plant palettes. While some of these might be harmless in interior portions 203 of the project, they should certainly not be used next to MSCP open space or in areas where their seeds could be carried via storm drains into the adjacent Preserve. Specifically, we call attention to *Schinus molle* (here called California pepper, more accurately called Peruvian pepper, reflecting the country it is native to), *Eucalyptus* species, *Acacia* species, *Olea europaea* (European olive), *Melaleuca* spp., *Myoporum* species and *Pittosporum undulatum* (Victorian Box). Also of concern is *Lonicera japonica* (Japanese Honeysuckle), a highly invasive vine, and *Atriplex semibaccata* (Australian saltbush), a highly invasive groundcover.

The City and taxpayers are spending tens of thousands of dollars and countless labor hours eradicating these same species from existing parklands where they threaten native species and habitats. Why not save taxpayer dollars and hours by substituting non-invasive species, native or non-native?

Sincerely,

Mike Kelly, president

202. These comments on specific species within the revegetation areas are acknowledged. The revegetation plan prepared for the Subarea Plan is conceptual in nature and a Master Revegetation Plan will be prepared to implement the revegetation associated with the Mitigation Land Bank.

203. See response 198 to the letter from CNPS above.

Response

Southwest Center for Biological Diversity

protecting and restoring the southwest's deserts, rivers, forests, and wildlife

May 18, 1998

Eileen Lower, Environmental Planner
City of San Diego
Development Services
Land Development Review Division
1222 First Ave., Mail Station 501
San Diego, CA 92101

RE: Comments on the Draft Master Environmental Impact Report for the Pacific Highlands Ranch (Subarea III) Subarea Plan in the North City Future Urbanizing Area (NCFUA).

Dear Ms. Lower

Thank you for the opportunity to comment on the Draft Master Environmental Impact Report for the Pacific Highlands Ranch (Subarea III) Subarea Plan. First, I would like to say that it is heartening to comment on a proposal with the potential to create a uniquely livable community. Many of the ideas set forth in the document are innovative and reflect concern for future residents and the overall quality of life. To take the plan from concept to product, however, requires careful attention to detail and carefully crafted policy to ensure successful implementation. As a result of the political context, both historically and currently, many of us, in the public, feel skeptical about the product that may result from a good concept once it has been influenced by powerful interests. In the case of Subarea III, some members of the conservation community, including our organization, are considering offering our support of the Phase Shift for the purpose of both promoting a livable community in the NCFUA and protecting critical habitat areas on Carmel Mountain. For this reason, we hope you will consider our comments carefully, and understand that we raise concerns in the hope that once our concerns are addressed we can feel comfortable with the plan and move forward.

To start, if our concerns are addressed, we would ultimately support Subarea Plan 1 and State Route 56 Alignment "F." This alignment of State Route 56 is consistent with the City's Subarea

San Diego Office P.O. Box [illegible] San Diego, CA [illegible] Tel. [illegible] Fax [illegible]
E-mail: [illegible] http://www.[illegible].org

PR-99

Plan for the MSCP and is a prerequisite to any development footprint in Subarea III, from our point of view

Given that, please consider the following directed comments

204 1 Figure 2-5 identifies several property owners in addition to Pardee It is presumed that they too will benefit from a successful Phase Shift because they are located within the Subarea There does not appear to be any specific discussion of these other properties in the MEIR Please discuss their status How will they be made consistent with the Subarea Plan? If Figure 3-1 (the map of land use in the Subarea consistent with Plan 1) shows these smaller properties as open space, will they ultimately remain as open space? If the map shows a development footprint, is that the development footprint the public can expect to result from approval of a phase Shift? Is there any guarantee or certainty about the future of these properties and their consistency with the plan as drawn in the MEIR?

205 2 The MEIR states that the processing of future specific development proposals will need to be consistent with the Master EIR Furthermore, findings based on an Initial Study will ensure this consistency What are the findings that have to be made? Please list the specific findings/criteria that must be satisfied to ensure that subsequent development is strictly implemented so as to be consistent with the MEIR

206 3 It is suggested that Pardee's commitment to mitigate exceeds their mitigation obligations (resulting from proposed development) by "many acres" However, restoration of approximately 100 acres of disturbed habitat is counted as a "Gain" in the MSCP equivalency determination, yet this acreage is to be used as a mitigation bank according to the MEIR If Pardee restores 100 acres of disturbed land, a short-term benefit may result, however, if Pardee is entitled to sell that land as mitigation in the future, the long-term net benefit is zero For this reason, either Pardee should be required to do the restoration outright, and prohibited from banking it as credit, or the restoration should not be considered a "gain." Pardee must show "extraordinary benefit to the City," therefore, it is our opinion that the 100-acre revegetation plan in Subarea III should be an outright requirement and considered an extraordinary benefit

207 Additionally, it should be recognized that using the City Manager's Compromise Plan line as the MSCP boundary on Neighborhood 8-A as a basis for judging equivalency is a misrepresentation of the facts The MSCP preserve boundary was never determined for Carmel Mountain, and to say that the City Manager's Compromise Plan reflects an adopted preserve line means that the biological function value, and acreage of the MHPA overall is being underestimated

208 4 In the Project Description (pg. 40 of the EIR), it is stated that the residential element of the plan would comply with the affordable housing requirements of the Framework Plan A set of options for fulfilling the affordable housing objective are listed The document never reveals which of these options has been has been utilized, or the manner in which it will be implemented In no way that affordable housing will be provided, without any explanation of how, or in what form is insufficient The list of options is flexible One of 4 options must be implemented but the
209 reader is left guessing which option(s) has been utilized Discussion of high density housing, which is contained throughout the document, is not a substitute, nor an explanation for how

Response

204 The land use designations shown in the proposed Subarea Plan would, if adopted, establish the future development potential for each ownership within the Subarea As individual development plans and tentative maps are brought forward, any proposal which is not consistent with the adopted Subarea Plan or the conditions described in the MEIR would require an amendment to the plan and additional environmental review

205. See response 204 above

206 The entire impact of Pardee's development will be mitigated through the dedication of undisturbed habitat within the MHPA Pardee will be conveying additional land within their ownership that is also in the MHPA, in excess of that required through application of MSCP ratios. Land within this additional area that is disturbed would only be restored by others at a later date, or by the City as funding permits The creation of a mitigation bank allows restoration to be done at an earlier date, enhancing the function of the preserve sooner rather than later. Restoration of land will always result in biological value to the preserve. That biological value is not reduced because some economic gain results.

207. See response to comment 149 to the Carmel Valley Community Planning Group

208. The exact method of implementing the affordable housing requirement of the Subarea Plan has not been determined. However, pursuant to the Subarea Plan, any of the options described in Chapter 7 of the plan may be used to satisfy the affordable housing requirements Each property owner within Subarea III would be required to comply with the affordable housing policies described in the Subarea Plan as tentative map condition of approval

209 See response 208 above

affordable housing goals will be met. Offering a breakdown of residential uses, as is done, does not answer that question for the reader.

210 5. The Pardee Settlement Agreement is mentioned but not discussed. A description or explanation should be included as public information.

211 6. Please add the following language (identified by quotation marks): Fencing along property boundaries should be designed and constructed of materials that are compatible with the open space corridors, AND "buried a sufficient depth to prevent edge effects that may result if people and animals dig under the fencing!"

212 7. When will the Habitat Management Plan be prepared? Will it be subject to public review? How will consistency with MSCP Table 3-5 be ensured?

213 8. On page 115 the EIR states that special management conditions apply including "minimization of edge effects (all), minimization of recreational use impacts (manzanita and ceanothus), and prohibiting collection and fire management (coast barrel cactus)." Fire management should be encouraged, not prohibited. Please revise/clarify this sentence which is unclear in its current form.

214 9. The EIR states that Third-Party Beneficiary status will be contingent upon "the permittee maintaining the biological values of any and all lands committed for mitigation pursuant to the permit and full satisfaction by permittee of mitigation obligations required by the permit." Will an annual audit/evaluation be conducted in order to determine if the permittee is fulfilling his/her obligations? Who will be responsible for monitoring whether obligations are being met? Will the evaluation be made public, or subject to public review? Some mechanism should be offered in the Final EIR to ensure compliance.

215 10. As a prerequisite, the public should know if the plan, as proposed in the MEIR, is consistent with the language of the 1985 Managed Growth Initiative (Proposition A). Can the reader assume that because the plan is consistent with the framework Plan it is also consistent with the Prop. A ballot language? If so, this should be stated in the Final MEIR.

216 11. Some important design issues appear absent from the document. We have been told verbally that a grade separation will be created between Street A/Village One, the preserve and the MHPA open space. Please include this detail in the Final MEIR.

217 12. The Biological Technical Appendix contains only a conceptual revegetation plan. The revegetation plan should be fleshed out for the Final document in order that we can assess its adequacy. Additionally, the Performance Standards contained in the conceptual revegetation plan also seem to be conceptual. On page 31, under the section entitled "Performance Standards," the document states that success criteria will be "defined by the Performance Standards (discussed
218 later)." They do not seem to appear anywhere later in the document. Please include the success criteria/performance standards in the Final MEIR.

219 13. Funding should be identified for the "park and ride" and transit center prior to adoption.

Response

210. There is not a Settlement Agreement associated with the proposed project. The references to the "Pardee Settlement Agreement" on pages 83, 105, and 186 of the draft MEIR are taken from the City of San Diego's MSCP Subarea Plan (Item (19).

211 Comment noted. Fencing consistent with the provisions of the MSCP and which is determined acceptable and approved by the City will be implemented as part of the Subarea Plan requirements.

212. The Habitat Management Plan has already been prepared as required by the City and is an attachment to the Subarea Plan. The plan will be revised as necessary and implemented by the City, who will be responsible for ensuring consistency with Table 3-5.

213. The sentence has been revised as the final MEIR to read: These include minimization of edge effects (all), minimization of recreational use impacts (manzanita and ceanothus), fire management and prohibition of collection (coast barrel cactus).

214. The landowner will be responsible for maintaining the land in its existing condition prior to conveyance into the MHPA. This generally means that any activities that have been carried out routinely by a landowner will continue (e.g., prohibition of trespassing). The City is responsible for ensuring compliance with its own MSCP Subarea Plan.

215. Proposition A enables Subarea Plans to be prepared within the NCFUA. A phase shift vote will be required to implement any Subarea Plan which is adopted by the City Council.

216. The EIR and Subarea Plan both include Conceptual Grading Plans. These Grading Plans evaluate grade separations between the MHPA preserve and the abutting development. Specific detailed project grading plans would be submitted when future discretionary projects are proposed and would include detailed wall design, landscaping, brush management, and grade separation between the MHPA preserve and the development.

217. See response 202 to the letter from the Friends of Los Peñasquitos Canyon.

218. Specific performance standards will be a component of the actual Master Revegetation Plan which will be prepared to implement the revegetation requirements.

219. Funding for the Park and Ride and Transit Center are included within the Public Facilities Financing Plan and Facilities Benefit Assessment. The estimated costs, funding source, and projected year of construction is also included within these documents.

Response

Thank you very much for your time and consideration. Again, it is exciting to imagine the type of community that could result from the proposed plan. It is never an accident when developments are planned wisely. Livable communities require political will, and hard work to make them a reality. I truly hope we see this concept evolve into a product that reflects wise planning and concern for the quality of life. A carefully crafted MCIR and Subarea Plan is an important step in the right direction. We look forward to reviewing the final public documents.

Sincerely,

Allison Rolfe

Allison Rolfe
Southern California Conservation

San Diegans for Responsible Freeway Planning

Reiposte

May 13, 1998

City of San Diego
Development Services Business Center
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego CA 92101

Attention: Ms. Ercon Lower Environmental Planner

Subject: ***Response to Draft Master Environmental Impact Report (MEIR) Subarea III Plan in the North City Future Urbanizing Area (NCFUA) (LDR No. 96-7918)***

Dear Ms. Lower

San Diegans for Responsible Freeway Planning appreciates the opportunity to present our comments on the NCFUA Subarea III Plan Draft Master Environmental Impact Report (MEIR). Our organization represents a large number of City and County of San Diego property owners and residents concerned about regional traffic issues and the alignment for SR-56. We look forward to reviewing the Final MEIR and seeing our comments incorporated in its analysis.

Our specific comments on the Draft MEIR are as follows:

1. The Draft MEIR clearly outlines significant advantages within the proposed subarea plan to the SR-56 Central alignment alternative over the other proposed SR-56 alignments. These advantages are addressed in the Executive Summary on pages S46-48, and on pages 419-423. The Draft MEIR Conclusions state:

   "Since the freeway would be separated from the community by open space, there would be a reduction in noise impacts to sensitive receptors and an incremental reduction in air quality impacts due to the straighter alignment of SR-56 and correspondingly lower miles traveled. The visual impact associated with noise walls to reduce freeway noise would be almost entirely avoided. This alternative would affect only one important cultural resource site, as opposed to six sites for the proposed 'D' alignment of SR-56 and five sites for the 'F' alignment. The central alignment alternative would reduce impacts to about 25 acres of potentially fossil bearing geologic formations."

   Section 4E. Landform Alteration/Visual Quality, also indicates that the existing aesthetic character of the area would be adversely impacted by having SR-56 running through the planned development.

   Negative visual, noise, pollution, regional mobility, and cultural resource impacts are identified for the SR-56 D and F alignments. As such, it would be inappropriate to

PR-103

220 subject current and future residents to these problems when the Central alignment alternative for SR-56 eliminates these issues.

221 In addition, given the proposed "community village" nature of the subarea plan and the fact that SR-56 will run through the middle of the community if alignments D or F are implemented, the negative environmental psychological impact of the SR-56 D and F alignments on the community residents should be fully analyzed in the Final MEIR.

2. In Figures 4B-1 and 4B-2, the Draft MEIR shows that the average daily traffic volume on Rancho Santa Fe Farms Road and Rancho Diegueño Road is projected to increase as a result of the subarea plan from the current 2000 vehicles to 5,900 vehicles. This is nearly a 200% increase in an exclusively residential area. These rural residential streets have extensive direct driveway access and no sidewalks, and they are regularly crossed by children, horses, dogs, and wild animals such as
222 bobcats and coyotes. In addition, at the current level of use, Rancho Santa Fe Farms Road has been the site of numerous serious accidents resulting in injury and destruction of property. To claim, as the Draft MEIR does on page 149, that a 200% increase in traffic on these rural residential streets is "not considered a significant effect", is clearly inappropriate. This projected increase in traffic must be mitigated.

3. The Draft MEIR is flawed since it does not adequately analyze the impact of
223 increased traffic on Rancho Santa Fe Farms Road, Rancho Diegueño Road and San Dieguito Road with respect to the following factors: noise, community character, public safety, driveway access, sight distance and posted speed.

4. Figure 4B-2 of the Draft MEIR shows that between El Camino Real and Camino
224 Ruiz, the only collector street north of Carmel Valley Road will be Rancho Santa Fe Farms/Rancho Diegueño Road. El Camino and Camino Ruiz are designated 4-8 lane major arterials, and Rancho Santa Fe Farms/Rancho Diegueño Road are 2 lane rural residential streets. It should be noted that on pages 114 and 132, and in Table 4B-9, both El Camino and Camino Ruiz are shown to have northern segments that will be reduced to level of service (LOS) E to F, while Rancho Santa Fe Farms/Rancho Diegueño Road will be reduced to LOS C. Given the LOS differential between these routes, the Final MEIR should analyze the impact to Rancho Santa Fe Farms/Rancho Diegueño Road resulting from anticipated diversion of El Camino and Camino Ruiz traffic to Rancho Santa Fe Farms/Rancho Diegueño Road.

5. Table 4B-1 of the Draft MEIR shows the design volume of Rancho Santa Fe Farms
225 Road as 7,500, but Table 4B-9 indicates a volume of 10,000. The Final MEIR should explain the differential between these figures.

6. In the discussion of the subarea plan's traffic circulation cumulative impacts, the Draft MEIR states on page 137, "A freeway segment analysis of Subarea Plan I shows that I-5 and I-15 are projected to operate at a LOS F. All freeway segments for SR-56 are projected to operate at a LOS D or better." Given the existing and projected problems

Response

220 This comment on the Central alignment alternative is noted. While some impacts would be lessened, it should be noted that significant impacts would result in other environmental issue areas.

221 The land use compatibility impacts associated with SR 56 freeway alignments and the proposed land uses under Subarea Plans 1 and 2 is described in the Land Use section of the MEIR.

222 See response 70 to County of San Diego (Doug Isbell) letter and response 145 to Fairbanks Ranch Association letter.

223. See response 222 above.

224 See response 222 above.

225. Different levels of service are used for design volumes and street capacities. The 7,500 is a design volume which is based on a level of service "C". The capacity of 10,000 is based on a level of service "E."

PR-104

with traffic congestion on I-5, I-15 and SR-56. The Final MEIR should include full mitigation measures resulting in LOS C or better for these freeway segments.

226

7. The previously distributed Draft EIR for SR-56 concluded that the northern alignments would have significant unmitigated impacts on the transit oriented development (TOD) goals for Subarea III incorporated in the NCFUA Framework Plan. This issue should be analyzed in the Subarea III MEIR with respect to the effects of the northern alignments on achievement of Framework Plan goals and overall land use planning within Subarea III.

227

8. The previously distributed Draft EIR for SR-56 concluded that the Central alignment would have significant unmitigated impacts with respect to fragmentation of a large block of habitat within the NCFUA environmental tier, and designated within the City of San Diego's MSCP Subarea Plan. The Subarea III Plan MEIR should analyze the degree to which the northern alignments would similarly result in fragmentation in the North Metropolitan portion of the County's Subarea Plan. In addition, the extension of surface streets required to serve the northern alignments should be documented in the Subarea III Plan MEIR, along with their effects on McGonigle Canyon and overall fragmentation.

228

9. If the Subarea III Plan MEIR concludes that fragmentation of a large habitat block associated with the Central alignment would result in significant and not mitigable impacts to biological resources and overall freeway planning, that conclusion should be documented by factual information. For example, it is our understanding that the habitat block of concern with respect to the Central alignment is approximately 1,200 acres in size, and that bisecting the habitat block with SR-56 would result in two habitat blocks of approximately 700 acres and 500 acres. It is also our understanding that SR 56 would be constructed in a manner that would minimize or mitigate impacts to wildlife movement. What species currently exist within the 1,200 acre habitat block that would not be able to persist while living within and moving between two habitat blocks, 700 acres and 500 acres in size?

229

We appreciate your consideration of our comments and look forward to reviewing the Final Subarea III Plan MEIR. Upon distribution for public review, please provide us with six copies of the Final MEIR at the following address: San Dieguans for Responsible Freeway Planning c/o Scott Harvey & Associates, 945 Fourth Avenue, San Diego, CA 92101.

Very truly yours,

SAN DIEGANS FOR RESPONSIBLE FREEWAY PLANNING

San Dieguans for Responsible Freeway Planning represents citizens from the communities of

Response

226. Planned mitigation measures for I-5 and I-15 are shown on Table 24 of the traffic report.

227. The Pacific Highlands Ranch EIR and Subarea Plan provide discussion and alternative plans for all four SR 56 freeway alignments. The Framework Plan goals and guiding principles include an open space system, a core mixed commercial, and a variety of housing types. These elements are incorporated into each of the four alternative Land Plans. While locating SR 56 south of Santa Monica Ridge has implications, the mixed use core continues to be incorporated into each land use plan. The Metropolitan Transit Board (MTDB) determines both type and timing of public transit. The applicant and City have been and will continue to work closely with MTDB to ensure that transit amenities are completed as soon as sufficient population exist to justify them. Funding for the Park and Ride and Transit Center are included within the Public Facility Financing Plan and Facilities Benefit Assessment.

228. The issue of habitat fragmentation associated with the northern alignments of SR-56 and the corresponding Subarea Plan is fully described in the Land Use section of the MEIR (Issue 5) and the Biology section (Issues 2 and 3).

229. All species currently residing in the 1,200 acre habitat block would be affected by the division of that block into two separate blocks. The impacts would be direct and indirect. The response to comments (USFWS letter of comment on the Final EIR for SR 56 (City of San Diego 1998) indicates that the Central alignment would be biologically inferior as it would not leave Deer Canyon free of artificial facilities, and meet requirement C.13 of the City's MSCP Subarea Plan). The USFWS has further identified Deer Canyon as a "core" area that should be protected from future development. See also the letter of comment above from the USFWS on the MEIR.

San Diego County Archaeological Society

Environmental Review Committee

17 May 1998

RECEIVED
MAY 1 1998
RECON

To: Ms. Eileen Lower
Land Development Review Division
Development Services Department
City of San Diego
1222 First Avenue, Mail Station 501
San Diego, California 92101

Subject: Draft Master Environmental Impact Report
Pacific Highlands Ranch (Subarea III) Subarea Plan for the North City
Future Urbanizing Area (NCFUA)
LDR No. 96-7918

Dear Ms. Lower:

I have reviewed the cultural resources aspects of the subject DMEIR on behalf of this committee of the San Diego County Archaeological Society.

We note the results of the cultural resources research performed by Gallegos & Associates and by RECON, and are, in general, in concurrence with the recommendations presented. Specific comments are as follows:

230 (1) There may be a need for mitigation measures for indirect impacts to sites which remain in open space. This should be specifically addressed when the individual tentative maps are submitted for environmental review.

231 (2) Both technical studies, as well as the DMEIR, fail to address curation of the collections from both the work conducted to date and the work to be required as conditions of approval of this and future individual projects. The attached *SDCAS Policy on Curation* addresses the issue. It should be noted that curation of the collections could be considered a partial mitigation measure for cumulative impacts to cultural resources. As suggested in the DMEIR, such impacts are significant and unmitigated.

232 (3) We will review the impacts and mitigation for the individual tentative maps when the applicable DEIRs are provided to us during their public review periods.

Response

230 As noted in the draft MEIR, indexing of sites in open space would be required as individual tentative maps are processed pursuant to the Subarea Plan.

231 The question of collections has been included as a mitigation measure in the final MEIR.

232 Comment noted.

Response

Thank you for including SDCAS in the public review of this document.

Sincerely,

James W. Royle, Jr., Chairperson
Environmental Review Committee

cc Hellegers & Associates
RECON
SDCAS President
file

Response

SDCAS POLICY ON CURATION
(Adopted by SDCAS Board on 10/21/97)

(1) For mitigation of impacts to cultural resources to be complete, all collections resulting from survey, testing, salvage excavation and monitoring activities must be curated in a qualified facility. "Qualified" is intended to mean one which meets the standards of 36 CFR 79 and any and all applicable federal, state and local laws. In the context of this policy, "collections" includes the artifacts and other collected material, plus all field notes, photographs and other documentation relating to them.

(2) To ensure reasonable accessibility to researchers, collections from within San Diego County should be curated within the county.

(3) Jurisdictions should require curation, as discussed in (1) and (2), above, for all collections resulting from new projects under their purview.

(4) Where a new project relies upon previous archaeological fieldwork as a basis for mitigation of a new project, the applicant must be responsible for locating, inspecting and upgrading, as necessary, all collections from the previous fieldwork. The inability to locate such collections will make reliance upon the work that produced them unjustifiable, and new fieldwork should be required.

(5) Jurisdictions should support and help archaeologists and others to solve the problem of locating, upgrading and curating earlier collections for which no provision was made for curation.

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May 18, 1998

BY FACSIMILE

Eileen Lower
Environmental Planner
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Re: Comments on Draft Master Environmental Impact Report for Pacific Highlands Ranch (Subarea III) Planned North City Future Urbanizing Area (FUA) Unit No. 96-7918; SCH No. 97111077

Dear Ms. Lower,

Thank you for the opportunity to comment on the above referenced Draft Master Environmental Impact Report ("Draft MEIR") for the proposed Pacific Highlands Ranch Draft Subarea Plan ("Draft Subarea Plan"). The Sierra Club very much appreciates the efforts of Development Services and particularly the City's ongoing facilitation of discussions by all parties and the numerous site visits. We look forward to continued constructive relationships and anticipate that these comments will lead to more constructive discussions regarding the City's planning efforts and conformance with environmental laws and regulations, as well as the proposed phase shift.

COMMENTS

Preferred Alternative

233 The Sierra Club supports the Plan 1 SR56 alignment as its preferred alignment alternative for the reasons articulated in the Sierra Club's letter of March 6, 1998 related to the Draft Revised Environmental Impact Report for the Middle Segment of State Route 56, (EIR No. 95-0449; SCH No. 96030309, which is included as Attachment 1. The Plan 2 alignment represents the best compromise between the needs of biological resources, the existing development and the need for community cohesiveness.

234 The Sierra Club specifically opposes the Central Alignment as it violates the standards and guidelines underpinning the MSCP planning process concerning preserve design criteria. To ensure adequate preservation of wildlife, plants and habitat types, the preserve design calls for

PR-109

Response

233. The Sierra Club's comments on the alignments of SR-56 are noted.

234 The Sierra Club's comments on the alignments of SR-56 are noted.

Response

paving intact the largest possible blocks of land. Fragmentation is correctly recognized as the antithesis of preservation because of the severe impacts of edge effects that development, including roads, brings to a habitat. The Central Alignment would fragment one of the largest blocks of habitat in the MSCP and the largest in the North City area. This area is part of a Core Biological area of the MSCP, one of the most important parts of the MSCP. It would fragment the last pristine coastal canyon and mesa top left in San Diego. As such, this alignment would compromise the biological integrity of the proposed MSCP environmental Tier and these impacts would be significant and unmitigable.

235 Further, the Central Alignment will have the following additional adverse impacts:

- Hydrologic Impacts: The Central Alignment subjects an unnecessary damages to a greater extent of hydrologic impacts, impacting a greater amount of floodplain than the Northern Alignment.

- Landform Alteration/Visual Quality: The Central Alignment would result in a more substantial contrast with the surrounding visual quality and undisturbed, natural character of the proposed MSCP preserve within Los Penasquitos Canyon. This is also an issue under the Local Coastal Program.

- Geology/Soils: The Central Alignment would be exposed to a greater extent of these constraints, specifically unstable soils and geologic units, liquefaction, landslides, and severely erodible soils. Also, the Central Alignment would be exposed to a greater extent of geologic hazards than the Northern Alignment, including a mapped landslide and a larger area of Torrey Formation along the slopes of Deer Canyon.

- Noise impacts: The noise impacts for the two alignments are not equal. The impacts to the life of the estimated 60 dBA noise levels of the Central Alignment as it traverses 1.4 miles of the Environmental Tier is not adequately addressed. Even the DEIR for Torrey Highlands at least recognized the probable negative impact of Central Alignment noise on mule deer and other wildlife. These cumulative negative factors and impacts of the Central Alignment represent a significant effect under CEQA.

- Wildlife Corridors: The 1.4 miles where the Central Alignment traverses the Environmental Tier is very conducive to wildlife movement. In fact, even cursory surveys reveal an existing network of trails and dirt roads currently used by wildlife to move in all directions over the ridge.

Land Use

The Draft MEIR states that Plan I would be inconsistent with the Resource Protection Ordinance ("RPO") in that it would allow encroachment on steep slopes in excess of that allowed under the RPO. Further, the Draft MEIR concludes that only the No Project Alternative or the RPO Alternative would mitigate for this loss. The Draft MEIR concludes that this encroachment is acceptable as compliance with the RPO would require a project redesign, thereby losing the benefits of the Plan I design.

235 Comment noted.

236 One of the purposes of steep slope ordinances is to prevent erosion and destabilization of slopes which lead to increased sedimentation loads in storm water runoff. The only storm water collection facilities are two proposed, but not required, detention basins. To mitigate for the surface water impacts of development on steep slopes, the Draft MEIR should require additional storm water management structures beyond the two retention basins in accordance with the Sierra Club's comments under Hydrology, Water Quality, below.

237 Further, the Draft MEIR has not surrounded the village center with higher density development (Figure 3-1). The low density residential developments to the northeast and northwest of the village center might be better zoned as peripheral residential with a corresponding increase in open space. Is this possible?

Traffic Circulation/Air Quality

238 The Draft MEIR's entire discussion of alternative modes of travel appears to consist of no more than paragraph on page 141. In this the Draft MEIR "envisions a system of trails and indicates the different types of trails possible." The Draft MEIR's discussion of transit is limited to the location of the transit center and the possibility of reaching it by a variety of transportation modes without further discussion. Page 142. In contrast, the city's Framework Plan requires the following of "[o]rganize land use:

> "[t]o . . . integrate facilities for non-automobile travel into the [MHPA] transportation system, and support alternatives to automobile use through land use and urban design principles."

239 The Draft MEIR also makes the puzzling statement in its Draft Subarea Plan that bike parking might become an "attractive nuisance." Draft Subarea Plan page 50.

240 Further, the Draft MEIR has concluded that this project will have significant direct and cumulative impacts on regional transportation. Pages 354, 398. Yet, despite this statement, the Draft MEIR asserts that "the Pacific Highlands Ranch Plan includes an effective and comprehensive development phasing program, which would preclude any significant impacts to
241 public services and facilities as traffic congestion." Page 184. The Draft MEIR also concludes that this project will contribute to significant cumulative air quality impacts. Pages 286, 400. With regard to cumulative air quality impacts, it states that "[n]o mitigation is available for cumulative air quality impacts at the project level." Page 400.

Alternative Modes of Transportation

242 Grand Conclusions. The Draft MEIR's evaluation of and planning for alternative modes of transportation is wholly inadequate. Nowhere does the Draft MEIR discuss the potential to mitigate significant adverse traffic and air quality impacts through the use of alternative modes of transportation. Rather, the Draft MEIR appears to tally-up the cumulative automobile related impacts and list transportation improvements designed for automotive travel and hope for the
243 best. The presence of a phasing program might make for orderly cumulative transportation

Response

236 The two basins shown in the MEIR on pages 218 and 219 are conceptual. The precise location and sizing of detention basins to serve the Pacific Highlands Ranch Subarea Plan would be determined at the time tentative maps are proposed for the various ownerships within the Subarea. All detention basins would be designed to reduce direct hydrology and water quality impacts to below a level of significance.

237. The proposed land use plan surrounding the Village Center is intended to provide a transition of land uses between the MHPA open space and the more intensive Core Residential Uses in the Center (i.e., Residential at up to 35 du/ac/net). As such, low density residential adjacent to the MHPA is planned northeast and northwest of the Village Center with intervening Peripheral Residential providing a mixture of residential uses.

238 The Subarea Plan includes specific design standards which are intended to integrate facilities to support alternatives to the automobile. The trail system will also provide opportunities for residents to hike or walk from their homes to the Transit Center. While the precise design of the transit center is not known at this time, the central location has been coordinated with MTDB. A location which allows buses to pick up and drop riders and circulate away from major roads is important. The park-and-ride facility which is located within the Employment Center will allow peak hour drop-offs and is located with easy access to Carmel Valley Road. The transit center also differs from the park-and-ride in that it does not provide large parking areas which detract from the urban Village, pedestrian-oriented goals.

239 The purpose of this sentence is to encourage bicycle parking facilities to be provided and well designed within the Village. The phrase "attractive nuisance" is confusing and will be deleted from the Subarea Plan. That statement was not included in the draft MEIR.

240. The referenced citation to page 384 in the draft MEIR is within the context of population growth and the phasing of development to ensure that there will not be indirect impacts on regional infrastructure.

241 This comment on cumulative air quality impacts concurs with the conclusions of the draft MEIR.

242. The Subarea Plan incorporates measures which would serve to reduce the project's contribution to cumulative air quality impacts. These measures include bicycle and pedestrian paths, transit center in the Village Center, and an Employment Center; all of which can reduce vehicular trips.

243. This comment on the development of transit services in the project as planned is acknowledged. See response 8 to the letter from San Dieguito for Responsible Freeway Planning.

impacts, but it will not preclude significant indirect impacts in traffic congestion. What phasing can do is develop transit services on step with development rather than waiting until most of the development is completed before providing transit services. The phasing program should require the completion of transit amenities as soon as sufficient population exists to justify the amenity.

244 Moreover, the Draft MPIR does not show how the City intends to integrate facilities for non-automotive transport and it provides no detailed guidance on where bike and pedestrian paths are appropriate given this requirement. Figure 3-9 indicates the location of the anticipated trail system. Has the City performed any planning with regard to this system? Is it based on any formal policy? What efforts has the undertaken to integrate this system to facilitate non-automotive transport, integration being more than mere existence?

245 The Draft MPIR states that air quality mitigations are not available at the project level. Why? An effective alternative transportation plan would help to mitigate the impacts of increased traffic and also air quality. The air mitigation might not be easily quantifiable, but mitigation does not include only emissions trading offsets, though these might be possible.

246 Bicycle Lanes, Paths/Parking. It appears that the City has not planned the bicycle path/lane system (or the pedestrian system for that matter) in accordance with any particular policy but rather has based the bicycle system on convenience and the use of MHPA lands, urban amenities in flood plains, and the right-of-ways alongside major roads. For example, the bike system does not link to the proposed east and west elementary schools (the west school has a pedestrian path and links to a MHPA trail, but schools do not going to be coming more frequently from the surrounding neighborhood and not the MHPA). Also, this lack of connectivity between schools means that kids will need to be driven to inter-school activities rather than walk or ride bicycles. As a further example, no bike path follows Del Mar Heights Road to the Civic Center in the Community Park and no bike path is shown going to the Transit Center. Figure 3-9. In addition, no bicycle paths are shown going here in existing developments. Figure 3-9.

247 Bike lanes appear to be required on major roads. The Draft Subarea Plan shows bicycle lanes on roads classified as A, H, C, D, and I. Draft Subarea Plan, Figures 4-5 – 4-9. Will the City require bicycle lanes on all roadways of these classes? If so, all of these bicycle lanes should be indicated.

248 Bike lanes are also needed on non-arterial roads. Figures 4-7 and 4-8 of the Draft Subarea Plan indicate that no bicycle lanes are provided for village roads. Why? These roads will be in high density automobile and pedestrian areas, the places where intermodal conflicts are most likely to exist. This is particularly true on roadways with diagonal parking because the travel lane edge is less well defined and drivers backing out may have difficulty seeing approaching bicyclists.

One of the advantages of bicycles over cars is that relatively high bike usage is compatible with hilly streets. Further, due to the steepness of bicycles relative to cars and the difficulty many bicyclists have on steep grades, it is very important that bicycle paths follow the shortest route
249 possible with the least grade change. Has the City evaluated whether any of its proposed bicycle paths are efficient for bicyclists?

Response

244 The Pacific Highlands Ranch Plan includes over 43 miles of trails to facilitate non-automotive transport. The location and design of these trails, which includes equestrian, bicycle, and hiking, have been closely coordinated with local equestrian groups, the San Dieguito River Park staff, state and federal resource agencies, and the community. Further, language is being added to the Subarea Plan which will require all projects at the time of discretionary approvals to submit a Trail Plan which further details the timing, easement dedication, and funding of these trails.

245 See responses 233 and 238 above.

246 The Subarea III bike path/lane system has been designed to facilitate non-automotive transportation. For example, the east and west elementary schools are linked with a bike path. The designated pedestrian path allows both pedestrian and bike transportation. Additionally, both bike and pedestrian trail links are made from the schools/parks to the various residential neighborhoods and Village along the urban amenity and the expanded pathway system. These trail systems will allow residents and children to get to and from the schools/parks via bikes or walking. Further, the regional trail system exhibits are intended to indicate only the major trail links within the project. Details of additional trail and bike lane linkages within the project and Village will be provided as part of the actual project plans and discretionary PCD approvals. It is fully anticipated that bike and pedestrian trails will link all parts of the project and provide a functional, well designed, non-automotive transport system.

247 See response 246 above.

248 See response 246 above.

249 See response 246 above.

250 What is meant by a bike parking area becoming an "attractive nuisance"? Draft Subarea Plan page 50. That is a legal term with a specific meaning and does not appear to make sense in this context.

251 The Sierra Club requests that the City incorporate planning guidelines for establishing bicycle paths for commuters that take into account, at a minimum, shortest routes, grade, speed and volume of automobile traffic, safety, and aesthetics. Following this, the City should reevaluate the proposed trail system for Subarea III to ensure that safe, efficient bicycle commuting is an option for all residents of Subarea III, including those residents in the denser areas.

252 *Pedestrian Paths and Walkways.* With regard to pedestrian traffic, although the City anticipates pedestrian friendly design around the transit center and civic center, nowhere does the Draft MEIR discuss how the City intends to incorporate pedestrian friendly design as a feeder system for these areas. Will all the roadways built in the Subarea conform to the designs in Figures 4-5 and 4-8 of the Draft Subarea Plan?

In order for pedestrians to walk to these areas, the walk needs to be relatively easy with regard to grade and relatively pleasant. Most of the multi-use trails identified in Figure 3-9 run adjacent to major roads, often between the roads and what appear to be large parking lots either required to
253 the park and ride and commercial retail facilities (see Exhibit 5-9 in the Draft Subarea Plan and particularly the parking provided for the commercial retail facility on the west side of the village center). What amenities will exist to buffer users from the automotive traffic and parking lots?
254 What planning requirements exist to break the "sea of asphalt" effect? Also, the pedestrian paths tend to follow planning zone borders rather than pass through neighborhoods. Will the City require that the neighborhoods adjacent to the village center have easy entrance and egress by foot for residents of outlying neighborhoods?

Figure 3-12 indicates that the town green will be edged by a "2 Lane Urban Main Street" and a "4 Lane Urban Collector with Parallel Parking". Further, it appears that the center of the village, the "Plaza", will be a rotary intersection for automobiles. The design for the town green appears
255 to make it a nice place to look at as one drives past, but not necessarily a pleasant place for lunch, a jog, a walk during a work break, or a village festival. Is this automobile priority intersection for traffic flow? Has the City performed any analysis of traffic flow within the village area? Would a pedestrian mall and additional green space provide higher quality and safer access to the area?

256 Moreover, the "4 Lane Urban Collector with Parallel Parking" will separate the town green from the community park. This seems to defeat the City's desire to create a unified village center. Given the proposed location of the high school/junior high and the park, the City can anticipate heavy student automobile traffic in this area as well as heavy student and youth pedestrian traffic between the school complex and the village center. Is this a safety problem? Has the City taken this potentially hazardous traffic area into account in its village traffic planning? Could these areas be linked by not having Del Mar Heights Road pass through them but rather be sunk underground (a common practice in other urbanized areas) or be terminated at the edge of the park? Del Mar Heights Road, after all, is not a through road (see Camino Santa Fe Closed). Valley Road, instead, merely appears to provide access to the village, the high School, and the few residential areas east of the village. What other options exist for linking these areas in a

Response

250 The purpose of this sentence is to encourage bicycle parking facilities to be provided but well designed within the Village. The phrase "attractive nuisance" is confusing and will be deleted from page 50 of the Subarea Plan.

251 Generally, the City has no adopted planning guidelines for bicycle paths regarding grade, aesthetics, or shortest routes. However, the Subarea III bicycle and trail plan has been designed with these criteria in mind and will provide a functional, well-designed, non-automotive transport system.

252. The Subarea III Concept Trail Plan is intended to show only the major project trails. As each project is submitted for discretionary approval, they will be required to provide detailed trail design information. This includes the Village and Town Center areas which will indicate pedestrian and bike access within and to the transit center and Village area. Figures 4-5 and 4-8 in the Draft Subarea Plan are intended to show the various project street sections. These include pedestrian and bike paths which are separated from the street with landscape buffers and other pedestrian friendly design elements.

253 Exhibit 5-9 of the Subarea Plan is intended to be illustrative only. Chapter 5, Community Design provides detailed discussion and development standards for the project and Village area. Standards for block size, setbacks, land use, parking, and building massing are included and are intended to create a functional, pedestrian oriented Village. Individual projects will be reviewed against these standards as part of the discretionary project approval process.

254 See response 253 above.

255. The Town Green/Civic Center is intended to be used for civic activities and open air public gatherings. The precise design, size and traffic analysis of the civic center, however, will be determined concurrent with the final commercial development permit within the Village. If developed by the City, this area will be a minimum of five acres. If not developed by the City, this area will be a minimum of two acres and will be owned and maintained as part of the larger commercial development. In either case, the civic center will need to function as intended by the Subarea Plan and will be subject to full public comments and review. Frequent intersections and cross walks will be provided along the four lane urban collector which separates the civic center/Village area and the high school/junior high/community park. The intersections will allow traffic and allow pedestrians to have easy and safe access between these two areas. Pedestrian flyovers or tunnels have not been considered.

256 See response 255 above.

Sierra Club Comments on
Pacific Highlands Ranch Draft MSEIR

more pedestrian friendly way? Has the City considered pedestrian flyovers or tunnels? Could Del Mar Heights Road at least be narrowed when it passes between the town center and community park?

257 *Mass Transit*. The City is planning a transit center and it indicates that it intends to integrate this center into a variety of transportation modes, yet does not discuss what policies or design elements are needed to do this. Locating it "close" to residential areas does not mean that commuters will walk or bicycle to the center. Rather, a variety of factors, such as safety, aesthetics, and efficiency determine this usage. Many commuters drive only a few blocks to transit centers and park and rides because the walk or bike trip is dangerous and/or unpleasant. What City planning elements and policies encourage walking or biking to a transit center or park and ride? Which of these are required by the Draft Subarea Plan?

258 With regard to the "kiss and ride" capacity of this facility, does it make sense to put this facility in the heart of the village? Given that a substantial number of drop-offs would occur, would it make more sense to locate it with easy access to Carmel Valley Road or another major road? A block or two additional walk, if pleasant, might not deter a pedestrian, but a lineup of cars in relatively narrower village streets could make the drop-off area more congested and reduce the attractiveness of the area for pedestrians.

259 Also, what transit amenities are provided in the residential neighborhoods? What feeder systems will gather commuters from the low density areas and bring them to the transit center? Will each low density neighborhood have a transit pickup site within walking distance of all the homes in a neighborhood so that neighborhood shuttles can transport commuters to the transit center? Have the transit plans incorporated the needs of the disabled and elderly?

260 *Parking*. The village center shows large areas devoted to parking lots. Draft Subarea Plan Exhibit 5-9. What guidelines exist for determining whether a facility must contain its parking within the footprint of a structure? Has the City determined the impact of parking lots on the propensity of commuters to walk to work? Also, the City should minimize the footprints for parking lots and require parking structures and require use of the land for small urban open spaces around buildings, whether these be private commercial spaces for restaurants or urban miniparks.

Biological Resources

261 Figure 2-5 identifies several property owners in addition to Pardee. It is presumed that they too will benefit from the Phase Shift because they are located within the Subarea. The MEIR does not appear to have any discussion of these other properties. Please discuss their status. How will they be made consistent with the subarea? If Figure 3-1 (the map of land uses in the Subarea consistent with Plan 3) shows the properties in open space, will they ultimately remain in open space? If the map shows a development footprint, is that the development footprint the public can expect to result from approval of a phase shift? Is there any guarantee or certainty about the future of these properties and their consistency with the plan as drawn in the MEIR?

Response

257 The City adopted the Transit Oriented Development Design Guidelines in 1992. Additionally, the Subarea III Plan includes specific design standards which are intended to make the project pedestrian friendly. The trail system will also provide opportunities for residents to bike or walk from their homes to the Transit Center. While the precise design of the transit center is not known at this time, the central location has been coordinated with MTDB. A location which allows buses to pick up and drop riders and circulate away from major roads is important. The park-and-ride facility which is located within the Employment Center will allow peak hour drop-offs and is located with easy access to Carmel Valley Road. The transit center also differs from the park-and-ride in that it does not provide large parking areas which detract from the urban Village, pedestrian-oriented goals.

258 See response 257 above.

259 See response 257 above. Also, transit service to the residential neighbors will be available. The precise routing and pick up shelter designs will be determined by MTDB concurrent with individual project discretionary permits.

260. Exhibit 5-9 of the Subarea Plan is intended for illustrative purposes only. Chapter 5 of the Subarea Plan provides development standards including street treatments, block size, and parking lot design. Page 47 of the Subarea Plan, for example, includes a requirement that parking lots will not be allowed on the main street frontages of Zones 2 and 3 and are discouraged within Zone 1. Parking structures are also encouraged and will be considered as part of the project discretionary approvals.

261 See response 204 to letter from Southwest Center for Biological Diversity.

262 The SEIR states that the processing of future specific development proposals will need to be consistent with this SEIR. From what I can tell, findings based on the Initial Study will ensure this consistency. What are the findings that have to be made? Please list the findings criteria that must be satisfied to ensure that subsequent development is strictly implemented so as to be consistent with the MEIR.

263 Pardee has to show "restoration/habitat benefit to the City." In order to do that, the HMP-acre revegetation plan on Subarea III should be an outright requirement. Pardee should not be able to get a mitigation credit after they do the restoration work as this would constitute double counting.

264 In the Project Description (pg. 40 of the MEIR), it is stated that the residential element of the plan would comply with the affordable housing requirements of the Framework Plan. A set of options for fulfilling the affordable housing objective are listed. The document never reveals which of these options has been, has been authorized, or the manner in which it will be implemented. To say that affordable housing will be provided, without any explanation of how or in what form is insufficient. The list of options is flexible. One of 4 options must be
265 implemented, but the reader is left guessing which option(s) has been utilized. Discussion of High density housing, which is common throughout the document, is not a substitute, nor an explanation for how affordable housing goals will be met. Merely offering a smorgasbord of residential uses does not provide clear direction for the reader.

266 The Pardee Settlement Agreement is mentioned but not discussed. A description or explanation should be included as public information.

267 Add the following language (in quotation marks): "Fencing along property boundaries should be designed and constructed of materials that are compatible with the open space corridors. AND "buried a sufficient depth to prevent edge effects (caused by people and animals digging under the fence etc)."

268 When will the Natural Management Plan be prepared? Will it be subject to public review? How will consistency with MSCP Table 3-1 be ensured?

269 On page 127 the EIR states that special management conditions apply including "minimization of edge effects (all), minimization of recreational use impacts (mountain bike and equestrian), and prohibition of location and fuel modification zones (most buffer zones)." Trail management should be encouraged not prohibited. Please reword/clarify this sentence which is unclear in its current form.

270 The EIR states that Third-Party Beneficiary status will be contingent upon "the permittee maintaining the biological values of any and all lands committed for mitigation pursuant to the permit and full satisfaction by permittee of mitigation obligations required by the permit." Will an annual audit evaluation be conducted in order to determine if the permittee is fulfilling his/her obligations? Who will be responsible for monitoring whether obligations are being met? Will the evaluations be made public, or subject to public review? Some mechanism should be offered in the Final EIR to ensure compliance.

262. See response 205 to letter from Southwest Center for Biological Diversity.

263. See response 206 to letter from Southwest Center for Biological Diversity.

264. See responses 208 and 209 to letter from Southwest Center for Biological Diversity.

265. See response 208 and 209 to letter from Southwest Center for Biological Diversity.

266. See response 210 to letter from Southwest Center for Biological Diversity.

267. See response 211 to letter from Southwest Center for Biological Diversity.

268. See response 212 to letter from Southwest Center for Biological Diversity.

269. See response 213 to letter from Southwest Center for Biological Diversity.

270. See response 214 to letter from Southwest Center for Biological Diversity.

271 As a prerequisite we need to know if the plan as proposed in the MEIR is consistent with the language of the 1985 Managed Growth Initiative (Proposition A). Can the reader assume that because the plan is consistent with the Framework Plan it is also consistent with the Prop. A language? If so, that statement should be made in the Final EIR.

Hydrology/Water Quality

272 The Draft MEIR on page 223 recites a litany of adverse impacts from urban storm water runoff and concludes that "pollutants carried therein would compromise the quality of downslope or downstream surface water and groundwater, affecting water quality both within Pacific Highlands Ranch and ultimately, ending up in the San Dieguito River and Lagoon, Carmel Valley, Los Penasquitos Lagoon, and the Pacific Ocean." Despite this statement the Draft MEIR concludes that "[t]he runoff of urban generated pollutants is not considered significant on a direct basis due to the presence of existing regulatory controls and the anticipated incremental nature and extent of such pollutants, though the unincremental contribution of urban pollutants would be cumulatively significant." Further, the Draft MEIR identifies a number of best management practices ("BMPs") but identifies only two new possible detention basins within the Draft MEIR. Figure 4D-3.

273 On what basis does the City assert that the application of existing regulatory controls would render the impact of urban-generated storm water pollutants insignificant? Pollution carried by storm water runoff regularly closes beaches and waterways after storm events despite the presence of existing regulatory controls. Therefore compliance with existing regulatory controls is not lessening or mitigating these impacts adequately.

274 Throughout the project, the storm drain infrastructure shows storm drainage emptying into natural drainages in the MHPA reserve. See Figure 4D-3. The Draft MEIR does not address storm water management practices at any of sites other than to say that "the exact number, size, design, and location of detention/retention basins will be determined in conjunction with future tentative map proposals" and in accordance with BMPs. Although it may be true that the construction details might be best addressed in tentative map proposals, the City has failed to provide overall project planning for storm water management.

275 The Draft MEIR's BMP list is quite brief and does not include recent developments in urban runoff control technology such as the system developed by StormTreat, the role of reverse osmosis, oil separators in parking lots, low flow diverters, etc. Is the list on page 215 a list of all the BMPs available to the City? If so, why? If not, what is the entire list of BMPs? What guidance does City staff use when evaluating the appropriate implementation of BMPs? Given the likely increasing impacts on beaches as develop continues, the City needs to provide increased guidance on the use of BMPs so that constituents are able to determine what the City will do to protect surface water quality. Mere reliance on a boilerplate statement about the use of BMPs is not sufficient for a meaningful environmental review.

276 Further, given increased surface water impacts and increasing ocean pollution, the Draft MEIR's reliance on BMPs without evaluating the actual pollution impacts is not merited. The Sierra

Response

271 See response 215 to letter from Southwest Center for Biological Diversity.

272. See response 206 above and response 197 to letter from San Dieguito River Valley Regional Open Space Park.

273 Comment noted. See also responses to the letter from the San Dieguito River Park.

274. The City of San Diego has developed Best Management Practices (BMPs) pursuant to the NPDES requirements of the RWQCB which apply to development proposals throughout the city. These requirements would be implemented as tentative maps are processed within Subarea III to ensure that water quality impacts are mitigated.

275. Figures 4D-3 and 4D-4 conceptually indicate potential detention locations for Subarea III based on the concept grading studies completed for the project. Comprehensive drainage studies for the entire Subarea to refine the location and determine sizing of these basins would be required.

276. See response 273 above.

Sierra Club Comments on
Pacific Highlands Ranch Draft MEIR

Response

Club requests that the City provide a plan for managing storm water runoff and associated pollution by:

277 1) Estimating water flows for each storm drain collection subsystem identified in Figure 4TH-3 and estimating the anticipated pollution and siltation loadings for each of these subsystems

2) Determining the impacts of the total Subarea III urban runoff on adjacent drainages and downstream waterbodies

3) Developing a control and mitigation plan for the Subarea that identifies the best available control technology applicable each urban runoff source, including but not limited to storm water drain outfalls, parking lot drain outfalls, residential landscaping runoff, etc. These need not be identified as to a required technology type at a precise location, but rather would provide the Project Applicant with basic policy guidance about the appropriate use of technology and particularly with the use of closely developed technologies. Further, a monitoring downstream of sensitive areas to determine whether or not the City was doing as claimed to protect their water

277 See response 275 above

278 The Draft MEIR admits that the cumulative impacts of urban storm water pollutants from cars throughout the NCFUA would be significant yet does not attempt either in this document or in the Framework Plan to manage or mitigate for this cumulative impact. If the cumulative impact is significant, the City must address this concern at each level of planning by proposing actions appropriate to that level that will control or mitigate the cumulative impact. Has the City performed any NCFUA-wide study on evaluating cumulative urban runoff impacts? If not, the

279 Sierra Club requests that the City undertake such studies. In the near time, the Sierra Club requests that the City manage and mitigate the urban runoff in Subarea III in accordance with the steps identified in (2) above.

278. Significant cumulative water quality impacts are identified in the MEIR and the implementation of the mitigation measures required by the City of San Diego as individual tentative maps are processed would reduce the cumulative effect in the region

279 This recommendation regarding NCFUA urban runoff studies is noted

Public Services Facilities

The Draft MEIR has identified two neighborhood parks and one community park and has not provided for any neighborhood gardens adjacent to the village center. Further, the Draft MEIR indicates that Miramar Landfill will reach capacity by 2011, well within the buildout period.

280 Are neighborhood parks located within one half mile of the southern and western developments of this subdivision? Will the City provide for a neighborhood garden for village center residents who otherwise would not have access to gardening?

280 While a Village Center includes a Town Green/Public Plaza, a community garden is not proposed in the Subarea Plan for Pacific Highlands Ranch

281 That Miramar Landfill will be at capacity in about 12 years even taking into account a 35% recycling diversion rate is shocking. After 2011, where will the City send its solid waste from Subarea III? This timeframe is well within the scope of the Draft MEIR. Has the City assessed the cumulative impacts of increasing solid waste generation in the NCFUA? To the maximum extent possible the City should provide for recycling in new neighborhoods. What factors prevent the City from implementing curbside recycling in this Subarea? That curbside recycling is currently not provided is more an artifact of the undeveloped nature of the area and is not necessary to extend the system. Has the City made any provision for neighborhood recycling

281 As described on page 300 of the draft MEIR, numerous solid waste reduction measures would be required as a component of a comprehensive solid waste management plan. These measures would include recycling facilities for multi-family housing.

centers? What regional systems exist for recycling now? The City provides waste generation rates for various generators. Page 356. What are the current corresponding recycling rates for these generators? Recycling storage is often problematic in multifamily housing. What requirements exist for adequate recycling facilities in multifamily housing?

Water Conservation

The City has been conditioning qualifying development projects within the City to install facilities for the use of reclaimed water to offset the demands of potable water of new planned users. The City recently combined this Subarea to install reclaimed water facilities and then later determined that the Subarea was outside the optimized service area. Further, the City spends scarce pipeline funds for proven water conservation strategies.

282 Why was the Subarea determined to be outside the optimized service area for reclaimed water after initially being considered to be inside this area? What is the status of the surrounding subareas? What factors affected this determination?

283 The Draft MEIR recognizes that the developers may be required to incorporate recycling facilities into kitchens, but what about incorporating water conserving appliances such as washing machines?

Population

284 The Draft MEIR states that "[f]inally, following adoption [...], the Pacific Highlands Ranch Plan would itself define what would be the planned location, distribution, density, and growth rate of the population in the area." Page 383. This comment on page 383 related to the effects of the Pacific Highlands Ranch Plan defining distribution and density seems to imply that the developer can ignore the City's planning and environmental review processes. Please clarify the intent of this statement.

Thank you for this opportunity to comment on this important project. If this land is to be developed, it is the Sierra Club's hope that we will continue to work together to create the best possible development for this land, both for the remaining natural resources of the area and for the future citizens of this community.

Respectfully submitted,

Paul C. Blackburn
Conservation Coordinator,
Sierra Club San Diego and Imperial County Chapter

Attachment

Response

282 The City of San Diego reduced the scope of the optimized service area for reclaimed water distribution and as part of that determination there is no surety that a reclaimed water system would be provided to that portion of the city.

283 Several water conservation measures have been included in the draft MEIR (page 3631, but this measure has not been included as part of the Subarea Plan.

284. This sentence has been clarified in the final MEIR.

ATTACHMENT 1
to
Sierra Club Comments
on
Pacific Highlands Ranch
Draft Master Environmental Impact Report

Response

SIERRA CLUB
San Diego Chapter

3820 Ray Street
San Diego, CA 92104-3823
619-281-5832

March 6 1998

Lawrence C Monserrate
Environmental Review Manager
Development Services Department
1222 First Ave MS 501
San Diego, CA 92101-5820

RE DRAFT REVISED ENVIRONMENTAL IMPACT REPORT (REIR) Middle Segment of State Route 56, LOR NO 95-0088, SCH NO 9603039

Dear Mr Monserrate,

The San Diego Chapter of the Sierra Club, after review of the above referenced REIR, recommends the adoption of the Modified Northern F Alignment for the middle segment of SR 56 The rationale for the adoption of this alternative route is based on the following considerations

1) The Central Alignment is completely unacceptable because it travels directly through the center of the high quality habitat designated for the Multi-Habitat Planning Area (MHPA) of the Multiple Species Conservation Program (MSCP) This area is one of the largest single blocks of undeveloped coastal land still remaining in San Diego County. Studies have shown that the MHPA is habitat for the federally endangered California gnatcatcher and other regionally sensitive species also protected under the MSCP The Central alignment would jeopardize and possibly violate the Implementing Agreement for the City's MSCP Subarea Plan
2) The Modified Northern D and F alignments are designed to avoid habitat fragmentation of the MHPA and both alternative alignments mitigate possible impacts where they cross wildlife corridors by the construction of bridges over the corridors
3) The Modified Northern F alignment does intrude on the northwestern edge of the MSCP, impacting about 22 acres more than the D alignment in the Expressway plan This intrusion is not considered significant (Table 4 3-2) since it does not fragment habitat and does not enter areas with high concentrations of Sensitive Plant Species (Figure 4 3-2) Sensitive Animal Species (Figure 4 3-3) or Gnatcatcher Habitat and Sitings (Figure 4.3-4)
4) The Modified Northern D alignment bisects the central area of the planned Subarea III community where commercial, employment, mixed uses and higher density residential units are proposed reducing the coherence of this central area of the planned community The Modified Northern F alignment does not bisect the central area, keeping it as an integrated community.

Response

5) In the Modified Northern F alignment, the highway runs between the central community and the MSCP preserve, effectively isolating the wildlife from the high usage area and creating a well defined demarcation of the MHPA. One concern is that sufficient barriers to wildlife be created along the southern border of the highway to prevent their entry onto the roadway.

As environmentalists we would prefer that no highway be built at all. But, given the projected population growth in this area, we wish to ensure a highway that preserves as much of our unique biological resources as possible while providing attractive and comfortable living conditions for our citizens.

Sincerely,

Jane A. Anderson, Chair
Land Use Committee

RECEIVED
MAY 08 1998

DIOCESE OF SAN DIEGO

DATE 05/07/98

TO Elaine Lower, Environmental Planner, City of San Diego

FROM Mr. Joel Zieg, AIA,
Construction Services, Diocese of San Diego

SUBJECT: Central Catholic High School and Parish Church w Pacific Highlands Ranch Subarea Plan (North City Future Urbanizing Area Subarea III)

On behalf of the Catholic Diocese of San Diego, the following comments are in response to my review of the Draft Master Environmental Impact Report dated 04/01/98 for Pacific Highlands Ranch Draft Subarea Plan with regard to Central Catholic High School and parish church:

285. Description of subject on cover sheet states " up to 5,456 units..." Table 2-3 of Subarea Plan states ". . will not exceed 5,470 units ... " Which is correct ?

286. Conclusions given at the beginning of the report should mention that the private high school will include a community parish church that will replace St. William of York on Del Mar Trails Road.

287. Section 5 and 8 of the executive summary should also mention that the private high school will include a community parish church that will replace St. William of York on Del Mar Trails Road

288. The last paragraph on Sheet S-43 states that approximately 9,054 units (type error?) would result without a phase shift. This is not consistent with the remaining text of this paragraph.

289. Figure 2-5 Ownership Map shows the wrong owner for parcel 305-021-01 to be. This should be corrected to: "Roman Catholic Bishop of San Diego, A Corporation Sole"

290. Chapter 1 Project Description, Section J: Anticipated Future Projects should be modified as follows: "... a conditional use permit for a private high school and parish church on the 54 acre Catholic Diocese ownership, ... ".

Response

285. This final MEIR has been revised to reflect this comment.

286. Comment noted. The conclusions at the beginning of the MEIR are general and more detailed information on the private high school has been incorporated into the text of the EIR as requested.

287. This final MEIR has been revised to reflect this comment

288. This final MEIR has been revised to reflect this comment.

289. The Subarea Plan will be changed for Parcel 305-021-01 to read Lin/Kazak.

290. This final MEIR has been revised to reflect this comment

291 ? Chapter 4.8 mentions a transportation analysis Appendix B. This was not included in our copy of the MEIR. We would be interested in reviewing a copy of this Appendix B.

292 a Chapter 4.8.1) Phasing Plan does not mention our project. Table 4B 11 shows our project occurring under phases D, F, & G. Table 4B-11 shows our project occurring under phases G, H, I, and J.

This raises several questions for us:

A. Why is our project shown as being built over several phases when it is our intent to construct the entire camp in one phase beginning 2004 and occupy the school one grade per year beginning 2005.

B. Should our project be defined in terms of Equivalent Dwelling Units to address the low density underlying zone?

C. Does this phasing plan need to be modified to meet our schedule?

293 Figure 4C-1 shows existing vegetation along the westerly boundary of our site. Table 4C-3 shows mitigation requirements for non-Pardee ownership for some of the same species of plants. Please clarify what portion, if any, of plants listed on 4C-3 are on our site. What will be our mitigation requirements ?

294 Existing vegetation along the westerly boundary of our site is also in the location of the required equestrian trail. No plan on grading the land for camp to the City for the trail. How does this impact the MMRP's proposed mitigation requirements?

Eileen, we would be interested in reviewing the Public Facilities Financing Plan (PFFP). The PFFP may answer some of our questions related to phasing and our participation in financing necessary public improvements.

We have reviewed the Draft Subarea Plan for Pacific Highlands Ranch and mailed comments to Cathy Winterrowd on April 25, 1990. If you have any questions on my comments, please call me at 234 8288.

Sincerely,

[signature]

Jon Jay King, AIA
Communication Services

cc: Rebecca Michael (Sullivan, Wertz, McDade, & Wallace)
Carlsbad 33

Response

291 The transportation analysis (Appendix B) is available for review at the Development Services Department at 1222 First Avenue, Fifth Floor, San Diego (236-6021), as well as at the Carmel Valley branch of the public library.

292 As shown in the Subarea III Transportation Phasing Plan the private high school is assumed starting in Phase E. The private high school is not phased. Other comments noted.

293 The vegetation communities listed on Table 4C-3 have not been calculated by ownership other than to separate out the acreages for Pardee and non-Pardee lands. However, a review of Figure 4C-1, Existing Vegetation, indicates that majority of the Diocese property is disturbed agricultural land. Any required mitigation would be determined at the time the Diocese submits a specific development proposal.

294 Mitigation in conformance with the ratios and standards set forth in the MHPA (see Tables 4C-4 and 4C-5) would be required as individual development proposals are brought forward. There would be adequate acreage and mitigation opportunities on-site to reduce biological impacts to below a level of significance.

Jeffrey H. Lin

W[illegible] Court, San Diego, CA 92127
Tel: 619 45[illegible] Fax: 619 45[illegible]

May 18, 1998

RECEIVED

1998

Ms. Eileen Lower
City of San Diego
Development Services
LAND DEVELOPMENT REVIEW DIVISION
1222 First Avenue, MS 501
San Diego, CA 92101

SUBJECT: PACIFIC HIGHLANDS RANCH (SUBAREA III) SUBAREA PLAN EIR - PUBLIC REVIEW COMMENTS

Dear Ms. Lower:

295 I am writing this letter of comment on the Draft Master EIR for the Pacific Highlands Ranch Subarea Plan as the owner of approximately 21 acres in the central portion of Pacific Highlands Ranch. For the record, I want to express my opposition to the land uses allocated to my property in Figure 5-7 of the Draft Master EIR, the Conceptual RPO Alternative Land Use. Specifically, this Alternative designates all of my property for development of a senior high school. This land use designation is totally unacceptable to me.

Thank you for the opportunity to review the Draft Master EIR for the Pacific Highlands Ranch. As a property owner and respondent on the Revised EIR, I would request that I receive a copy of the Final Master EIR.

Sincerely,

Attachment: Figure 5-7, Conceptual RPO Alternative Land Use Plan (with property outlined)

cc: Cathy Winterrowd, Community Planning

Response

295 Comment acknowledged.

Response

May 19 1998

RECEIVED

MAY 1998

Eileen Lower
Environmental Planner
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, CA 92101

Re: Draft MEIR for Pacific Highlands Ranch - Subarea III Plan LDR No. 96-7918

From: Cindy Klaus (APN 305-021-11 and 305-040-10)

Dear Ms Lower,

The following are our comments to the April 3, 1998 Draft Subarea 3 Plan document

General Comment

296 The following Plan 1 graphics do not show the correct location of the north/south 1100 foot wide "Neighborhood Parkway". They are figures 3-14, 3-18, 3-19, 4D-3

Figure 2-5 Ownership Map

297 Prestige Estate, Inc. is not the correct name for this parcel (305-021-11). It should be changed to read as Lin/Klaus

Table 3-2

298 The "New Zoning Designations" do not match the ones shown on Figures 3-20 and 3-21

Page 36 - Neighborhood Parkway Areas

299 This section states that the north/south neighborhood parkway for will be shifted about 800 feet east of the alignment shown in the Framework Plan. This statement is not correct. The north/south parkway location is shown correctly in most of the figures (see Figures 3-9 and 3-11) and is in the approximate location shown on the Framework Plan.

300 This section should also state that in Plan 1 the north/south Neighborhood Parkway will shift to the east on the Ledgegreen and Maddock parcels if these parcels are purchased as part of the SR 56 right-of-way acquisition.

Page 38 - Open Space Overlook (Trail Heads)

301 This section should also identify the size of the trail heads.

Land Use Plan Exhibits:

302 It should be noted that the following figures do not accurately show the development bubble/or MSCP boundary for Lee Living Trust parcel 305-040-10. The development bubble should be larger. Although the development area misrepresented is small (approximately 4.5 acres) this may effect the acreage calculations shown for development area and MSCP. They figures that are effected are 3-9, 3-11, 3-20, 3-21, 4A-5, 4A-8, 4C-4, 4C-5, 4E-4, 4E-5, 4E-6, 4E-7

Response

296. This final MEIR has been revised to reflect this comment.

297. The Subarea Plan will be changed for Parcel 305-021-11 to read Lin/Klaus

298. Updated zoning maps from the Subarea Plan have been included in the final MEIR.

299. Comment noted.

300. The location of the north/south Neighborhood Parkway will remain as shown regardless of whether or not the parcels are purchased as part of the SR 56 right-of-way acquisition.

301. The location of the trail heads in the Subarea Plan are intended to be conceptual. The precise design and acreage will be determined as part of a discretionary permit.

302. The development plan indicating the development area and MSCP boundary was established using the official 1" = 300' scale MSCP map. No changes to the development area boundary are anticipated for parcel 305-040-10 at this time. Precise development boundaries and dwelling units will be determined at the time of a project's discretionary approval.

Land Use Plan Figure 6-6 :

303 The location of the PAL illustrated in this graphic is incorrect. The size and location should be similar to Figure 3-2

Again we appreciate the opportunity to provide comments on the Draft MHPA document. Please contact me if you would like to discuss these items in further detail.

Sincerely,

Cindy Kassal
9333 Chesapeake Mesa Blvd 210
San Diego, CA 92111

cc: Cathy Winterrowd / City of San Diego - Community Planning

Response

305. Comment noted

April 28, 1998

RECEIVED

To: [illegible], [illegible] Planner
[illegible], Associate Environmental Planner
[illegible], Senior Planner
Lawrence C. Monserrate, Environmental Review Manager
City of San Diego Development Services

[illegible]

304 Upon studying the impact reports of the proposed SR-56 alignments, we find that Alignment "F" would be a DISASTER to our Rancho Glens neighborhood and surrounding areas, in terms of proximity (about 800 feet from Caminito Mendiola and 2[illegible] feet from Rancho Glens property lines), with a permanent environmental impact of loud traffic noise echoing down Caminito Mendiola. This is extremely unfair to Rancho Glens homeowners, who purchased homes for the express purpose of the rural peace and quiet. Because our homes are right next to McGonigle Canyon, the closer the freeway alignment to our neighborhood, the more the loud freeway noise will ricochet and resonate from canyon to homes. Alignment F would be so detrimental to Rancho Glens homeowners that it must be taken out of consideration NOW.

Please consider the tremendous and permanent deleterious impact Alignment "F" would have on Caminito Mendiola. We request that your decision show compassion to homeowners already in the area. It is imperative that you take Alignment "F" out of consideration NOW.

Sincerely,

[signature]

Dr. Thomas J. Kipps
Head of Hematology and Oncology, UCSD

[signature]

Lori C. Kipps
Housewife
[illegible] Caminito Mendiola, San Diego

Response

304 Comment acknowledged. Please note that prior approval of Rancho Glens Estates did not preclude other development in the surrounding areas.

Eileen Lower, City of San Diego, Development Services, Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101 RECEIVED

PACIFIC HIGHLANDS DEIR

COMMENT #:

THE DEIR UNDERSTATES THE ENVIROMENTAL IMPACT OF THE PROJECT ON EXISTING HOMES AND BUSINESS IN THE FUA, PARTICULARLY WITH REGARD TO THAT PROPOSAL INVOLVING THE PARDEE ALIGNMENT OF SR56 (ALIGNMENT F)

305 THE PARDEE ALIGNMENT (F), and the subplan for Pacific Highlands accompanying it destroys the most existing neighborhoods, private homes, and businesses of any proposed. It ruins the investments and quality of life for all existing residents in the Future Urbanizing Area (FUA).

The only compelling reason to even study THE PARDEE ALIGNMENT with an expensive DEIR is to unfairly shift all of the quality of life degradation of a freeway to existing homes, businesses, and small property owners in the FUA for the benefit of developers.

New residents to the FUA can choose to live next to a freeway, and alternatively, developers can mitigate the adverse impacts of SR56 during construction. Existing FUA residents have neither option without severe financial hardship. For them noise, pollution, and scenic degradation can't be mitigated.

Existing home and small business owners in the FUA have already developed their properties in accordance with all current zoning mandated by the voters. To favor undeveloped, defended, and idle crop land belonging to a high density developer such as Pardee over existing residents is unfair and wrong.

THE PARDEE ALIGNMENT RUINS MOST EXISTING HOMES, BUSINESSES, AND NEIGHBORHOODS IN THE FUA.

I agree with the City Engineering Department original recommendation that the Central Alignment for state route 56 is the best. This alignment respects the interests of both developers and current residents of the FUA alike.

Mark J. Teissen MD
6 year resident of FUA-Address on file

cc: Susan Golding, Mayor
Harry Mathis, City Council
Randy Cunningham, Congressman
Howard Kalogian, Assemblyman
Legal/Media Coordination Team

Response

305. Comment noted. Please see response 304 from Thomas Kipps letter.

Robert Lower, City of San Diego, Development Services Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101

PACIFIC HIGHLANDS DEIR

COMMENT #2

ESTIMATES OF HUMAN DEATH AND SUFFERING ARE OMITTED FROM THE DEIR. PACIFIC HIGHLANDS WILL CAUSE SIGNIFICANT NOISE POLLUTION, SCENIC DEGRADATION, AND AIR QUALITY DEGRADATION FOR ALL LOCAL FUA RESIDENTS AS WELL AS THE CITY OF SAN DIEGO.

The DEIR for Pacific Highlands understates the local effects on Rancho Glens Estates for noise pollution, scenic degradation, and air quality dimensions. This is particularly acute with the Pardee Alignment of SR 56 (R) and the associated plans for Pacific Highlands

306 Having interior noise thresholds of 45 dBA exceeded in Rancho Glens at all 16 homes tested with windows open (SR 56 DEIR page II-25) with the Pardee Alignment (R) of SR 56 is a significant impact that will be impossible to mitigate even with millions of dollars of added construction or compensation payments.

307 The DEIR also glosses over the significant air quality degradation for San Diego as a whole. There are estimates of up to 400 tons of added air pollution generated from the 38,50,000 new residents of Pacific Highlands and associated commuter traffic added to the existing 805/5 merger traffic. This traffic congestion and air pollution is in addition to the excessive traffic and pollution of planned SR 56

Air Quality degradation is particularly acute with any of the Northern Alignments of SR56 and associated plans for Pacific Highlands

As a physician, I ESTIMATE THAT PACIFIC HIGHLANDS AND ANY NORTHERN ALIGNMENT OF SR 56 WILL CAUSE 50-100 HUMAN DEATHS PER YEAR FROM RESPIRATORY COMPLICATION DUE TO AIR QUALITY DEGRADATION. There will be added significant suffering for many asthma and other respiratory patients in the local San Diego area as well.

Mark J. Tarasen MD
6 year resident of FUA Address on file
Homeowner Rancho Glens Estates

cc: Susan Golding, Mayor
Harry Mathis, City Council
Randy Cunningham, Congressman
Howard Kalogian, Assemblyman
Legal/Media Coordination Group

Response:

306 This comment regarding interior noise impacts/mitigation described in the SR-56 EIR is noted.

307 The draft MEIR acknowledges that the development of Pacific Highlands Ranch would contribute to cumulatively significant air quality impacts within the San Diego Air Basin

Eileen Lower, City of San Diego, Development Services, Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101

PACIFIC HIGHLANDS DEIR

COMMENT #1

THE NORTHERN ALIGNMENTS OF SR56 AND ASSOCIATED PACIFIC HIGHLANDS PLANS ARE ENVIROMENTAL NIGHTMARES. THE PARDEE ALIGNMENT (E) OF SR 56 AND PACIFIC HIGHLANDS IMPACT VITAL WILDLIFE WATERING SITES CONTIGUOUS TO RANCHO GLENS AND McGONIGLE CANYON.

The DEIR's environmental analyses and conclusions with regard to PACIFIC HIGHLANDS AND ANY NORTHERN ALIGNMENT OF SR 56 are flawed and should be corrected

308 Independent analysis and study have concluded that the northern alignments are at least equally environmentally sensitive as the central alignment. When all planned interchanges and cross streets are built, the additional disruption of habitat by the northern alignments certainly exceeds that of the central alignment.

309 Furthermore, the DEIR does not even mention the large pond on the western edge of Rancho Glens Estates and McGonigle Canyon or the year round stream on the southern edge of the same community

These are vital water sources for animal life including deer, coyotes, rabbits, migratory birds, and others YES THERE ARE DEER HERE I KNOW BECAUSE THEY ARE IN MY BACKYARD

310 All Northern alignments of SR 56 add noise and light pollution that will certainly degrade the ability of wildlife to utilize these water sources contiguous to Rancho Glens A high Density design/phase shift for Pacific Highlands will only add to this degradation

In addition, many of the Pardee Pacific Highlands plans essentially surround these natural water sources and sensitive knolls/hills on three sides with noisy, lighted, golfing, freeway, and other development and thus hampers wildlife access to a degree that cannot be mitigated.

Mark J Jamsen MD
J-LA Homeowner for 6 years
Address on file

cc: Susan Golding, Harry Mathis, Howard Katzenstein, Randy Cunningham, Legal/Media Coordinator/Team

Response

308. Please see page 3 of the letter of comment on the draft MEIR for Subarea III from the US FWS/CDFG

309 Although the precise location of these areas cannot be determined from this comment, both of these general areas would be within the MHPA open space area proposed under either Subarea Plan. Also, it is recognized that seasonal variations within riparian zones occur from year to year. The vegetation mapping presented in the MEIR regarding these locations is considered representative of the habitats present.

310 Indirect impacts (e.g., noise and lighting) associated with the proposed Subarea Plans are addressed in the Biology section of the MEIR on pages 193-195 and are considered significant.

Albert Hoover, City of San Diego, Development Services Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101

PACIFIC HIGHLANDS DEIR

COMMENT #4

THE AGRICULTURE IMPACT OF THE PLAN WILL BE SIGNIFICANT AND UNMITIGATED

The DEIR wrongly minimizes the agricultural impact of the project.

311 We assert that the land indeed qualifies as Prime Farmland as defined by the California Department of Conservation in direct conflict with the statements contained in the DEIR concerning agricultural impacts.

The DEIR needs to be corrected on this issue of agriculture, as the PARDEE Project destroys at least 3 working nurseries and multiple sites of horticulture

Mark J. Jansen MD
A voter resident of FUA-Address on file

cc: Susan Golding, Mayor
Barry Mathis, City Council
Randy Cunningham, Congressman
Howard Kaloogian, Assemblyman
Legal/Media Coordination Team

Response

311 Comment noted. However, the draft MEIR on page 317 indicates that direct and cumulative impacts to agricultural resources are significant and unmitigated

Ellen Lewer, City of San Diego, Development Services, Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101

PACIFIC HIGHLANDS DEIR

COMMENTS

THE BIOLOGY IMPACT OF THE NORTHERN ALIGNMENTS OF SR56 WILL BE SIGNIFICANT AND UNMITIGATED

The DEIR wrongly concludes that biology impact of ANY northern alignments of SR56 and associated Pacific Highlands plans can be mitigated.

312 Independent study of the northern alignments have demonstrated that they are equally or more environmentally sensitive than the Central Alignment and cannot be mitigated. This study is available for review by city planners in making their conclusions.

I agree that the City Engineering Department original recommendations for the Central Alignment of state route 56 is the best.

The plans for Pacific Highlands need rework in this context.

Mark J. Ramsey MD
6 year resident of PHA-Address on file

cc. Susan Golding, Mayor
Harry Mathis, City Council
Randy Cunningham, Congressman
Howard Kaloogian, Assemblyman
Legal/Media Coordination Team

Response

312. Please see page 1 of the letter of comment on the draft MEIR for Subarea III from the USFWS/CDFG.

Eileen Lower, City of San Diego, Development Services Land Development Review Division, 1222 First Avenue, MS 501, San Diego CA 92101

PACIFIC HIGHLANDS DEIR

COMMENT #6

THE APPROVAL OF ANY DEIR FOR PACIFIC HIGHLANDS MUST SUSPENDED PENDING AN APPROVAL OF A FINAL DEIR FOR SR56 ALIGNMENTS.

WHAT IS THE RUSH?

313 A DEIR for this community cannot be finalized, prior to the FEIR of SR 56 which is a major component of the FUA and of this project.

The DEIR Plan for Pacific Highlands need to be suspended and to be re-worked pending resolution and litigation concerning the DEIR for SR 56.

Sincerely,

Marie Tamsen MD
6 year resident of FUA-Address available

cc. Susan Golding, Mayor
Harry Mathis, City Council
Randy Cunningham, Congressman
Howard Kahn, Assemblyman
Legal/Multi Coordination Team

Response

313. The EIR for the SR-56 project has been finalized. It is anticipated that the San Diego City Council will review and consider the final EIR at a hearing on June 30, 1998. While the MEIR for the Pacific Highlands Ranch Subarea Plan can be finalized and certified with or without the certification of the SR-56 EIR, it should be noted that the Subarea Plan cannot be implemented until the SR-56 alignment is chosen.

March 18 1998

RECEIVED

Eileen Lower
Environmental Planner
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, MS Station 501
SAN DIEGO, CA 92101

RE: PACIFIC HIGHLANDS RANCH (SUBAREA III) SUBAREA PLAN in the NORTH CITY FUTURE URBANIZING AREA (NCFUA)

Dear Ms Lower,

The following letter is to protest the Subarea III plan proposed by Pardee Construction Company.

I Existing Traffic Congestion.

At the present time, the I-5/805 junction is a commuter's nightmare During rush hour, the commute from downtown to the Carmel Valley area takes more than an hour On Friday afternoons, Northbound traffic on I-5 and 805 starts to back up from La Jolla Village Drive at about 2:00 p.m. and commuters are gridlocked for hours at a time Southbound traffic on I-5 and 805 fairs no better Traffic crawls at the peak hours, and commuters are stuck in traffic jams with no way out.

314 Pardee is planning to build 5,456 new residences in Subarea III It is estimated that there will be at least 38,000 new residents in Pardee's new development. In addition Caltrans estimates that after completion of SR56, at least 10% of I-15 traffic will be diverted to I-5 and 805 Creating such additional traffic congestion on already gridlocked freeways is irresponsible and poor planning by the City of San Diego A moratorium is required on the building and development of any new communities near the I-5/805 junction until the City addresses and resolves the enormous traffic issue which will only be aggravated by the completion of SR56

II Unfair Location of Objectionable Projects on Existing communities at Rancho Santa Fe, Rancho Glens Estates and Rancho Santa Fe Lakes

Response

314 The traffic report for Subarea III contained an analysis of both I-5 and I-15 Based on the analysis, improvements for I-5 and I-15 were identified and are shown on Table 24 of the traffic report

III Unfair Location of Questionable Projects on Existing communities at Rancho Santa Fe, Rancho Glens Estates and Rancho Santa Fe Lakes.

315 Pardee plans to build a fire station, a welfare housing project, a high school, junior high school and an elementary school within the area of these communities, at some distance from Pardee's Pacific Highlands development. Why should established, beautiful communities bear the brunt of providing Pardee's development with unwanted and undesirable buildings/ services when they benefit Pardee's project?

We propose that Pardee provide these services and house them near the town center of Pacific Highlands and away from million dollar residential estates.

IV Unfair Process, Failure to provide Notice to Residents who will be the Most Adversely Impacted

316 The president of the League of Women Voters, at the hearing of the San Diego Planning Board Commission on May 7,1998, stated that the planning of Subarea III by Pardee is an example of the democratic process. This is false. Rather, it was a most unfair process as those most affected were not advised or involved of Pardee's plans until well after it was too late to provide any input to their decision.

None of the residents of Rancho Glens Estates were notified of the fact that Pardee was planning to put walking trails in our backyards. Neither was our input sought to identify and locate the sites for the public service buildings and welfare housing units within our community. This is not an example of the democratic process. This is an example of a wealthy, powerful corporation manipulating residential property owners solely for Pardee's financial interests. Pardee has acted without any regard or concern for these owners' property rights.

IV Pardee's Alignment of SR56, the "F Alignment," is Unfairly Burdensome to Existing Communities

317 It is preposterous to plan a four lane freeway next to existing communities of million dollar homes merely to protect future communities, one of which has not even been approved by voters yet. The prospective residents of Pacific Highlands and Seabreeze Farms have a choice. They can choose to buy a home next to the freeway or, if this is objectionable, they can buy elsewhere in an area not near SR56. Also, the new community could be planned with the new freeway in mind, such that the new community is minimally affected by it. Unfortunately, the residents of Rancho Glens Estates and Rancho Santa Fe Lakes have no choice. When we bought our homes we relied on the Framework Plan from the City which apparently misrepresented that there would only be 1 home per 4 acres and more importantly that SR56 was so far away (Deer Canyon) that we never even considered it an issue. Now, after having relied on this information and using our life savings to buy beautiful homes in the peaceful setting of the country, we find we were not told the truth. Due process and

Response

315 This comment regarding the location of land uses under the proposed Subarea Plans is noted.

316. See response 108 to the letter from Rancho Glens Estates Homeowners Association.

317 This comment on the several alignments of SR-56 through Subarea III is noted.

Response

and Parker's Pacific Highlands development without considering the property rights and Constitutional rights of residents within the area. Continuing to steam roll over the rights of existing property owners will not work to anyone's advantage. On the contrary, it will result in costly and extended litigation and bad publicity for Parker and the City.

Very truly yours,

Silvia O. Tamsen

Silvia O. Tamsen, Esq.

7015 Vista Del Mar Ave, La Jolla, CA 92037 April 30, 1998

Lt. Lawrence C. Monserrate, Environmental Review Manager
Development Services
Land Development Review Division
1222 First Ave, MS 501
San Diego, CA 92101

Dear Mr. Monserrate Re Pacific Highlands Ranch MEIR, SCH # 97111033

Thank you for sending me the referenced report for comment. In my opinion, it is certainly adequate for the purpose intended, although it is so long that it tends to obfuscate the issues involved. My comments are as follows:

GENERAL COMMENTS

318 In my opinion, the number of dwellings, and hence traffic, proposed under all the phase shift plans is very unwise when one considers that I-15 and SR-56, as presently, will as several intersections, are already operating at unacceptable levels during peak use hours. Therefore, I recommend RPO alternative, if the Phase shift is not approved, non-phase shift Plan 1 Alternative which would reduce the "Once -configured" impacts listed on Table S-2 from 8 to 4. It would also reduce the automobile trips per day (ADT) from 88,500 to 40,000, a much more realistic number.

SPECIFIC COMMENTS

Trails

319 The Multi-Use trail shown on Figs. 3-10 & 3-11 *should be divided by a split rail fence to separate the equestrians on dirt from the bikers/hikers.* Such a divided trail has been very successfully in the area between Carmel Valley Restoration and Enhancement Project, as shown in Exhibit 1.

Response

318. Comment noted.

319. This recommendation regarding fencing for the multi use trail is noted.

Geology/Soils/Erosion

320 (A) Scripps formation (Tsc) page 291, add "The Scripps formation also contains some thin bedded shale layers that are considered expansive soils." (see Ref 1)

321 (B) The symbols for Geologic formations (Td, Tsc, Tf etc) in Figures 4H-1, 2, & 3 are heavy and illegible in most cases. I suggest that these figures be color coded, as most Geologic maps are, using the same color code as in Ref 2, i.e. light blue for Td, dark blue for Tsc, green for Tf etc.

Thank you for your consideration in these matters.

Sincerely yours,

Dr. John Northrop, PG

Consulting Geophysicist

Enclosures

Encl 1, Photograph of the fence dividing the Carmel Valley trail for horses (on the right) and hikers, joggers/bikers (on the left). Looking West. Stevens house in left background, riparian corridor on right. Horse, ISANDTI. Photo by Northrop, fall, 1997

References

Ref 1, Kennedy, M.P. (1975) Geology of the San Diego Metropolitan Area, California, Bull. 200, Cal. Div. Mines and Geol, Sacramento, CA

Response

320. Comment noted

321. Figure 4H-1 in the MHIR is taken from the geotechnical report prepared for the project and larger scale representations of the map are included in the geotechnical appendix to the MHIR.

Response

PR-140

Response

To Mr. Lawrence C. Monserrate
Environmental Review Manager
City of San Diego
Development Services
Land Development Review Division
1222 First Avenue, Mail Station 501
San Diego, Ca 92101

RECEIVED

[illegible]

DIVISION OF ENVIRONMENTAL ANALYSIS SECTION

From Mr. Robert D. Barczewski
Rancho Del Sol Nurseries, Inc
Zero Energy Systems, Inc
Trustee, Barczewski Family Trust
6561 Black Mountain Rd
San Diego, Ca 92130

Re Subarea III phase shift. Draft MEIR

Dear Mr. Monserrate

This will be my third response to the proposed phase shift of Subarea III by the applicant, Pardee Construction Company. Due to the extreme negative impact to Rancho Del Sol, the land owned by the Barczewski Family Trust, Robert D. Barczewski, Trustee (under Declaration of Trust dated 8/10/77), this written response is lengthy and many issues are addressed. Also included is a brief history of the land.

I attach herewith our previous correspondence, copies of the Rancho Del Sol PRD permit, Planning Commission Resolution, Tentative map, a memo from Cathy Winterrowd to Randi Coopersmith and other pertinent documents. Since the various open space easements, the EIR, my 4-85 application for a CPA (Zero Energy Project), State of California permits, Recorded Rancho Del Sol Subdivision map 12477 are voluminous and on file with the City I

will not include them here. Also my written comments to you on Route 56 will not be included here although I will be referring to them.

A brief history of Rancho Del Sol and the FIDA follows.

The Mendiola family ran a fleet of Spanish galleons out of Mexico for a couple of hundred years and supplied Pueblo San Diego with arms, munitions and provisions. We are descendants through my mother Beatrice Mendiola. The "Jupiter Cannon" at Presidio Park was brought over by one of our ancestors. Therefore, the name of the street Caminita Mendiola.

Don Cordero, a retired soldier who was garrisoned at Pueblo San Diego was the first rancher (sheep, cattle, etc.) and eventually owned most of the area. Via a Mexican land grant he acquired this land, which included Del Mar. He managed to maintain a small part of his ownership after the Bear Flag Republic. After 1846 and the Gold Rush came the McGonigles, Neimans, Hampes, Zuelchers, and others who dry farmed the land. In 1886 Old Black Mountain Road was established and became the dividing line of land ownership. Several of their descendents live locally and are active in the agriculture business. After W.W.II the Barczewski came back to San Diego from the Philippines after four years in Santa Tomas as POW's. Then came the Ukegawas (tomato growers), Collins (Evergreen Nursery) and myself (Rancho Del Sol and Nursery).

In 1962 a moratorium was created in the area. John F. Kennedy and Bobby Kennedy had the County place a moratorium on all property owned by the Teamsters Union (and others), who at that time was controlled by Jimmy Hoffa, and other lands owned by the Las Vegas group including Morris Shenker, etc. All this was done to stop the development from

Response

easterly Penasquitos to Del Mar. During this time the original alignment of Route 56 was established.

In 1964 the City of San Diego annexed the land and promised A-1-1 zoning. In 1971 easements were granted to the City of San Diego for the Del Mar 30" water line and the McGonigle canyon 18" sewer trunk.

In 1974 the City filed a general plan and placed a moratorium on the land, only allowing A-1-10. And denied A-1-1. Around 1982 clustered residential densities of one acre minimum size were allowed with 3 acres to be placed in an urban reserve (City Council Policy 600-29). On November, 1985 proposition A was voted in to stop Pardee Construction Company and others from further encroaching on the FUA (North-City-West, Fairbanks Village, portions of Penasquitos, etc.). The general plan scheduled the FUA to be placed into planned urbanizing by 1992 without a City-wide vote.

In 1992 the City Council adopted a framework plan of which we were not notified as we were in the Northwest "horsing around", attending Gonzaga University (R. Christopher Burzewski) and starting up a horse ranch. I attended all previous meetings in 1991 and early 1992 and was assured that Density Transfer Rights (Residential Dwelling Units) would be given to those who had ownership in the "Environmental Tier". This did not take place and without our knowledge and consent, the environmental tier evolved into MSCP.

The Specific History of Rancho Del Sol is as follows:

- 1975 Started looking at the Deseret Trust property
- 1979 Purchased 264 acres. The entire property was leased to the Okegawa Tomato Growers. All but the steep slopes, gullies and creek beds were being farmed. Prior to the

Response

close of escrow over 800 migrant farm workers were camping in several areas of the land and adjacent. And a condition of the close was for their removal from the land. Although they were moved, they returned and formed several camps in the various Arroyos.

- 1982-83 Settled the land and built the compound called "Fort Apache" which included a 3 wide mobile mobile-home. Started growing trees and planting them on some of the perimeter. Farming operations continued. Executed a Parcel Map and temporarily realigned Black Mountain Road at the insistence of neighbors and Deseret Trust. Convinced the City Engineers that part of the (present day) alignment would only be temporary and was a vast improvement over the existing old Black Mountain Road. He was concerned about the S curve and prophesized vehicle accidents. These did occur over the years and there are two very serious accidents and a couple of deaths. I promised that the road would be aligned along the Del Mar Pipeline easement and that I intend to do.
- 1981 The last great El Nino took out McGonigle Reservoir. Apparently the spillway was filled by dirt causing the dam to be breached. The creek bed and banks contained the water and the fringe area did not flood. In Deer Canyon the reservoir filled up and its spillway became a 20-ft. deep crevasse. A landslide occurred on Santa Monica Ridge. This was caused by benching or terracing the north slope next to the sewer main and lake. The slide is at the saddle of the ridge on the east end of Lot 1.

Great fires whipped up by Santa Ana Winds from the East have occurred in the past at a frequency of one large fire every ten years and smaller ones every five years. The two large ones that I witnessed was in late 79 and November of 1989. These Santa Ana grass and brush fires cannot be controlled once started and become wild with speeds up to 40 knots or so. Columns of flame, over fifty feet high, were common. I participated in the

fire fight of 89 and let me tell you, it was frightening: watching fire trucks racing away from it at 35 mph on the agriculture roads. We commandeered two D-8 bulldozers and disced brush and fire breaks wherever we could. The Okegawa dozers and crew appeared to the east of Iron Apache and cleared large areas of brush and weeds. Zurcher dispatched his dozer and large discs to Lot 31 and created large firebreaks around the Mendleck property and Lot 31. We went up Santa Monica Ridge and dozed what we could and was forced back down the ridge road. Fortunately 20 acres of Lot 1 was previously disced and ready for farming. The fire jumped up Santa Monica Ridge east of Lot 1, Deer Canyon, Cordero ridge and canyon exploded into a very large high intensity fire and continued west at high speed incinerating every thing in sight. The fire was totally out of control burning through the night. The next day the Santa Ana winds came back and whipped it up and headed at high speed to Palacio Del Mar. Helicopters with five-hundred gallon buckets ferried water from the Deer Canyon reservoir. The fire was finally stopped at Palacio Del Mar. At the time, everyone thought that it would burn through to the ocean. I have videos of this episode.

This October or next we expect a big one (1998 or 1999). We have had the big rains and therefore grass, weeds and brush will be quite overgrown and ready to fuel a much larger fire than the fires of 79 and 89. This time we have a large problem. The Deer Canyon reservoir is gone. Where will the helicopters get water for the next Santa Ana fire fight? Fortunately, I installed two fire hydrants at the toe of Santa Monica ridge at both ends of Lot 1 and all the way up Caminito Mendiola and Rancho Santa Fe Farms road to Black Mountain. We have disced all areas possible. Zurcher and Okegawas farming operation has taken care of all the land surrounding the Rancho Del Sol PRD. Unfortunately, not much has been disced between Santa Monica Ridge and Del Mar Mesa. Due to the situation, I foresee a very high fire risk for Del Mar Mesa. We only have an old thin

Response

waiting less than four months to prepare and make repairs to the reservoir or create a new one. There are several residential developments that are in danger

- April of 1985 filed an application for GPA. I proposed an alternative development project employing alternative architecture for commercial, condos, apartments and estate residential. I employed Cal Poly School of Architecture, Rocky Mountain Institute, and others. Created computer models, and made determinations of our microclimate. Obtained year around climate data and ran computer simulations to prove the feasibility of the various Zero Energy structures that we had designed. Identified microclimate and southeast facing slopes to be a major energy resource for stand alone heating and cooling. Identified the southeast facing slopes of Santa Monica Ridge as being the most prime followed by Cordero Ridge and McGonigle Canyon (Lot 31 and most of the lots in Rancho Citrus Estates). Specific architecture and models for Lot 1 and Lot 31 were developed and constructed. My project was transit oriented employing water conservation and recycling, alternative landscaping and grading. This application is on file with the City and is a very serious demonstration development proposal. It has been on hold since 1985 as a result of Proposition A. The application only proposed a demonstration project on about 30-acres. Of the 264-acre parcel on where Rancho Del Sol Nursery is presently located. A mix of commercial, condos, apartments, office buildings, and single family structures was to be constructed and demonstrated to the City and State.
- October 1986 City approval of the revised Rancho Del Sol Subdivision tentative map and Planned Residential Development. EIR completed and certified.
- July, 1987 Established Rancho Del Sol Nursery
- July, 1989 Sold Parcel 2 (40 acres) to Cindy Kasai

Response

- October, 1989 Recorded Rancho Del Sol Subdivision map 12477 and PRD. Initiated development. Sold 29 PRD lots to Dunico, Inc. Retained Lots 1 and 33 of the PRD. CC & R's established. HOA named Rancho Glens Estates.
- July, 1993 Expanded Rancho Del Sol Nursery into a full fledged nursery with 1acre greenhouse, etc., etc.
- 1996 Revised planning as a result of Route 56 Boundary dispute with Rancho Lakes
- 1998 Deer Canyon reservoir-dam collapsed. Planning revisions for additional Route 56 Alignments. Pardee's phase shift proposal and impacts to Rancho Del Sol. Responded to Route 56 Draft EIR's. Assessment of impacts to Rancho Del Sol due to Route 56 and Pardee Construction Company's proposed phase shift plans

General Comments

I am appalled at what is being proposed by this ill-fated Master EIR. In my opinion, it is promoting violation of the U.S. Constitution, the State of California Constitution, various County and City Ordinances, municipal code, City Council policies, the general plan and even the general concept of the Future Urbanizing Area. Over the years, the City has managed to whittle away at rights of property owners, particularly small property owners with limited resources. Limiting their freedom by overlaying layers of adopted plans such as the FUA General Plan, the adopted facilitiework plan and lately, the City's adoption of the "MSCP" and establishment of "MHPA" preserve boundaries. The latter has become a great concern to myself as it has to many others. The taking of farmland and converting it to habitat has caused a massive problem in the area surrounding Rancho Del Sol, a very high probability of reoccurrence of Santa Ana Wind wild fires such as that that occurred in 1979 and 1989. I predict a similar fire this year or next year (October through December) therefore, the MSCP/ MHPA plans' concept is not only a taking of land but is endangering

the health, safety and welfare of our rural community and endangering private property. Smoking cigarettes is safer than being in the MHPA. I am an environmentalist, but only to the extent that private property rights, agriculture/ farming rights, health, safety and the welfare of others are not violated.

Now that I have got this of my chest let us cut to the chase.

322.1 The City of San Diego has failed to notify Sandra L. Barczewski, Trustee (BDT 1984), Zero Energy Systems, Inc. and Robert D. Barczewski, Trustee (BDT 1977) - Landowners, of

a. City Council hearing on the Framework Plan

b. MSCP/ MHPA

c. Pardee's phase shift application of 1994 (we were thrown in it and not notified).

d. Pardee's deals with the City

In 1991 and early 1992 I attended all the workshops concerning the FCIA and the environmental tier. The City staff assured me that there would be density transfers and preservation of agricultural land. It would be similar to Marin and Sonoma county. This has vanished. Thinking that this was the plan and that we would be appropriately compensated for "the take" we went to the Northwest to establish a horse ranch and to attend Gonzaga University (R. Christopher Barczewski). As a result, we did not receive notices so that we could defend our land and land values.

323.2 No where is there even a mention of the Rancho Del Sol Subdivision and it's PRD. Please refer to the attached maps. This was recorded on October 18, 1989 along with a certified EIR. As such, the MHPA is flawed and is violating City Ordinances and Municipal code. The negative open space easement grants to the State and the City does

Response:

322 The referenced background material does not address the adequacy of the MEIR, and has not physically been included in the final document. However, it is incorporated by reference into the final MEIR, and is on file (see LDR No. 35-0414) and available for public review at the offices of the Land Development Review Division, 1222 First Avenue, Fifth floor, San Diego, California 92101.

323 Notification for the public hearings on the Framework Plan, the MSCP, and proposed phase shifts was done according to local and state requirements.

not allow any public access (trails, etc.) Rancho Glens Estates is the name of the Home Owners Association. The PRD and open space easements are off limits to the public.

324 3. There is no mention of my General Plan Amendment application of April, 1985 which was put off calendar as a result of the enactment of Proposition A, a few months later. My proposal for the Zero Energy Project still stands. Even with my limited resources, we spent over $350,000 in this endeavor. Sometimes I relate myself to John Reardon in Ayn Rand's "Atlus Shrugged". As a result of Prop A I then modified the approved tentative map and finally executed the existing subdivision map and PRD in order to pay off the mortgages.

325 For Years we have identified the need for some commercial and mixed use on the northern property. This has been our input to Latitude 33 Pardee, the City and especially during the 1991 workshops. The northern land is adjacent to the County estate lot development area and we consider ourselves to be in the sphere of the San Dieguito Planning area. They have been already identified the need in the area for office buildings, some commercial and mixed use. Our land is the only thing around that would fulfill this need. This would be somewhat similar to the Rancho Santa Fe Village except for the alternative architecture, T.O.C. and indigenous landscaping.

326 Of great value is my discovery of the southeast facing slopes of Santa Monica Ridge, Cordero Ridge and Lot 31. Can you fathom the value of a residential or commercial structure that heats and cools itself without gas or electricity, year round for a hundred years or so? This was validated by the Cal Poly School of Architecture using models and microclimate data in their computer simulation studies. Results of these computer runs were presented to the City of San Diego with my GPA application. This has to do with mitigating global warming. The MHPA proposal would foreclose this tremendous asset.

Response

324 The sale of the approved Rancho del Sol subdivision and PRD is acknowledged. However, throughout the MHR and Subarea Plan the subdivision is referred to as the project name of "Rancho Glens Estates." Please see Figure 2-1. Figure 2-5 identifies the parcel as the Blakeslee Subdivision and also shows the Zero Energy System parcel. The remainder of this comment regarding the prohibited public access to various open space easements is acknowledged.

325 The status and history of the referenced General Plan Amendment application of April 1985 is acknowledged.

326. These comments regarding the preferred land use designations for the ownership is acknowledged.

Response

By the way, I was a consultant to the National Center for Atmospheric Research (Boulder) and the Desert Research Institute (Reno) during the period 1967 through 1972
327 I worked for Drs. Telford, Squires and Kellog (NCAR) who were then conducting flights through hurricanes and thunderheads with various kinds of aircraft and attempting to model the earth's atmosphere in their computer programs and powerful computers. Dr Kelling is the Chief person who identified Global Warming. My job at the time was to apply very sensitive instrumentation and classified space, missile and avionics systems and data to their flying laboratories. I learned much from these talented gentleman and applied this knowledge to alternative approaches to residential and commercial structures and began the search for land that would accommodate zero energy structures. Rancho Del Sol was it. Several years later I raised enough money to purchase the land in 1979. After constructing a passive solar house, with other alternative features, in Palos Verdes Estates and living in it for a few years, I moved the family back to San Diego. "Lock, Stock and Barrel". I quit the Aerospace Corporation, terminated my consulting business, custom home building company, sold out my land holdings in Palos Verdes Estates, two restaurants and a commercial fishing boat and settled on the land. I designed a 3 wide mobile home, had it constructed and installed a wind/ solar power station (independent of SDG&E) to power the house. This became my real time living laboratory for the next two years. During this time I performed independent research and measurements and formulated the Zero Energy Project and alternative transit oriented community. The City then was interested in stopping any development in the FUA. All my efforts "went to hell in a hand basket" as a result. No one in City Hall listened or was interested. They were too engrossed in stopping development. The end result became the existing PRD which by the way was the first. The only petition in opposition was Pardee Construction Company due to their land holdings to the North, East and West. In order to mitigate the influence that they had with City Staff I had to sue the City to eliminate the unfair and

327. Comment acknowledged

easily conditions that were placed on the Rancho Del Sol Subdivision. Other first in the FEIA are (1) Certified EIR, (2) Fish and Game Permit, (3) State of California Coastal Commission Permit. I will never forget the time when the Fish and Game warden came out to give me my permits. She said that I was the first to ever apply for one before the fact. She told me stories about incidents with Pardee and others, including the City- more

328 or less indicating to me that there had been an ongoing battle and infractions. Mind you, this was in 1986. Subsequent to this time, there have been other major incidents. No wonder that the City and Pardee are experiencing major problems with F&G and Coastal. What bothers me is that citizens such as ourselves are paying for the sins of the past. There definitely exists a polarization between the governmental agencies.

328 Comment acknowledged. The Zero Energy Project parcel (305-021-50) is identified on Figure 2-5 of the FEIR.

329 After Prop A and approval of my last tentative map and PRD (1986) it was suggested by various planners (City included) to offer the property to Pardee or to have Pardee pay for the cancelation of the PRD. Pardee declined. Several times we have proposed to Pardee boundary adjustments and land swaps. Again they declined. A month ago I made another attempt on the east boundary. Again they declined.

329 Comment acknowledged.

330 4. Proposed MHPA – Please refer to my correspondence of 3/3/98 to the City Attorney's Office, 3/18/98 to Pardee and Latitude 33, 5/1/98 to the Planning Commission.

330 Comment acknowledged.

Of the 156 acres in the Barczewski Family Trust, 146 acres or 93.6% of our land is proposed for contribution to the MHPA. This is not acceptable and will not be allowed for various reasons. Please refer to the Rancho Del Sol Map.

a. The 6.5 acre parcel (2 tax assessor parcels) to the east of the PRD is developed and zoned A-1-10. The finger canyon or gully was filled with compacted dirt and contains a 10-inch commercial sewer line and public utility easement. On the east boundary

there is a 1,000-ft long Negative Farming open space easement. We are farming this parcel and have planted ornamental trees, shrubs and ground cover (mother stock) for the nursery. We are also using it for soil mixing and will be utilizing it for our thoroughbred horse breeding stock. Both of Pardee's plans show this as part of the MHPA when in fact the MHPA and the MSCP show this property developed and not part of the MSCP. 4.5 acres are affected. None of this property is in the coastal zone

331 b Lot 31, 10.3 acres, is in the PRD boundary and is currently zoned A-1-10. 2 acres of it are overland with a negative biological easement granted to the City of San Diego. It is not in the coastal zone. Except for the Biological easement it has been extensively farmed and graded. In the past there have been several fires and much of the gentler slopes have been bulldozed for fire breaks. It contains an 8-inch water line and 8 inch sewer. Planning of this property is for high density residential at the top and estate residential at the bottom. The estate residential of 7 one-plus acre lots can be accomplished (A-1-1) and would become a part of the PRD. It has access (60 ft strip of land) to the private street. Currently, no public access is allowed (PRD boundary and Negative biological easement). For all practical purposes that lot is developed and is mitigated. Certified EIR. Both the steep slopes and gentle slopes are southeast facing and are therefore a major resource as they will accommodate the zero energy structures as proposed by the GPA proposal of 1985. The RPO fails to incorporate this or identify southeast facing slopes as a resource and must be included

332 for posterity. There exists a non-building area easement which was requested by the City (but Pardee) in 1986. I granted the easements with the understanding that all NBA and slope easements be extinguished once the primary arterial road situation is established. There are several lots in the PRD that are affected (Lots 12 through 17 and 19 through 21). Since all Pardee phase shift proposals identify the prime arterial location north of the PRD there is now no need for these NBA easements except

Response

331. Comment acknowledged. This position on the application of the MHPA to the subject property is noted.

332. These comments on the status of Lot 31 is acknowledged.

possibly for a west ingress/egress for the PRD. I will initiate extinguishment of these NSA easements in the near future

333 I would like to mention that public trails through the Lee Living Trust parcel is not a good idea. First, it is to be a biological preserve (gnat catcher, etc.). Second, it is a major breeding ground of the Mojave Green Rattlesnake (very plentiful- several hundred kills over the years that I know of). Now I have been told that the U.S. Marine Corp. bred these snakes during WWII for the purpose of dropping them on the Japanese held pacific islands. There is no mention of this snake in your EIRS. They are highly poisonous. Please research the origin of these snakes. If they are indigenous to the Mojave Desert, what are they doing here? It appears that they should be destroyed for the purpose of public safety and for the birds, particularly for the gnat catcher.

334 On another note, there is a small agricultural pond at the center and is a watering hole for coyotes, bobcat, etc. A few years back I sighted a black panther in this area. I ventured in several times (armed) both day and night. There was a large colony of pack rats and several hopping rodents that looked like miniature kangaroos (kangaroo rats). The black panther looked very old and apparently was living off the rodents and cottontails. It shied away. Local folks told me that this cat was somebody's pet that got away many years ago. Haven't seen him since. Your EIR did not mention the Road Runner. They are fairly plentiful and appear to breed in Lin property canyon. There have been many sightings in the PRD. I haven't seen any in the East McGonigle Canyon area. I was told by one of our nursery employees that in Mexico they are a delicacy and cross bred to chickens. Interesting to me that the residents of "Rancho Diablo", the migrant camp, consumed them. A week later he called me over and proudly showed me a caged Road Runner. I brought him a frozen chicken the

Response:

333 These comments on the status of Lot 31 are acknowledged.

334. According to the project biologist, the Mojave green rattlesnake referred to in this comment is likely to be the southern Pacific rattlesnake (subspecies of western rattlesnake) which is very similar in its appearance. The Mojave green rattlesnake is restricted to the deserts of California, Arizona, and Nevada, and the deserts and mountains of mainland Mexico. It is not found in the coastal areas of California. The southern Pacific rattlesnake is not considered a sensitive species.

next day in trade for the bird and had him let it go. Later I told him to breed and eat rabbits (Coteport instead. I gave them a hutch and a breeding pair in exchange for the promise of not to trap Road Runners.

Peregrine falcons (a couple of breeding pairs) have been sighted directly above the Nursery. I have seen them hunt this arroyo. Also, several other birds of prey including barn owls.

335c Lot 1, 20 acres is zoned A-1-10 and is a part of the PRD. Equestrian lots are planned for the future (reference CC & R's for Rancho Cielo Estates. It has two sewers (8" and 10"). Two 8" water lines and two fire hydrants. In 1981, during the last El Nino, the McGonigle canyon dam (agricultural Reservoir) breached and at the same time a landslide occurred at Santa Monica Ridge on the east end of this parcel. Over the years, dirt from remnants of the 17-ft dam and the landslide were spread out and tilled into the soil during farming operations. Also, export dirt from Rancho Cielo was placed and spread. Except for 6.5 acres, all of Lot 1 is above the 100 year flood line. Negative farming open space G delineates the 100-year flood plain. A 48-inch RCP (storm drain) exists north of Lot 1 at the street and empties out through Lot 1 to McGonigle Creek. The 10 inch sewer trunk traverses this parcel. The fire hydrants are at each end of the parcel and were installed for the purpose of combating future fires. The parcel is fenced and gated at three places. Trespassers have ripped out the gates several times. A creek crossing is maintained for police, fire trucks and city maintenance vehicles. This is not a permanent crossing and one needs to be constructed. The State of California Coastal Commission issued me authorization and permit to channel the remnants of the reservoir. This has not been done and will be needed in the future. The Rancho Del Sol certified EIR describes the hydrology and the flood plain, based upon the 1983 topographic survey that I had flown.

14

Response

335. The referenced species were not observed during the biology surveys of the project site. The biology surveys of the project site were conducted by Natural Resource Consultants during 1996 and 1997. A biology technical report documenting the results of the surveys is an appendix to the MEIR. Table 4C-2 in the MEIR indicates that while the peregrine falcon was not observed during the surveys, it is a species which could occur on the subject property. The reference to the peregrine falcon (a MSCP covered species) is acknowledged, but this species was not observed during the biological surveys.

336 Pardee's flood plain analysis (Exhibit 33) is suspect. To the northeast they are preparing mass grading and modifying the natural drainage channels and as a result will be concentrating runoff towards Lot 1, Lot 2 and Lot 3. We are also concerned about concentrated runoff in Subarea IV and of course, Rancho Penasquitos. Now, the McGonigle Reservoir that was excavated in the 40's still exists. It must be returned to its natural state and channeled. Keep in mind that the 18-inch sewer trunk is next to this lake bed. Therefore remedial work must be done. Page 106 of the MEIR states that no flood control structures or features are proposed in the future for the creek systems in Subarea III. Has there been a combined hydrology/ runoff analysis of the combined effects of Pardee's property development plan NE of Rancho Del Sol, Subarea IV and Penasquitos? I believe that none of this has been done and that flood control features will be required to mitigate the runoff created by up stream development. Pardee's proposal is not acceptable.

I have provided comment- Written and oral. I have met with their planners and engineers and put them on notice. The drainage basins are in the Coastal zone. Permits will be required from the State of California to restore the land east of Rancho Del Sol to channel runoff.

337 Lot 1 (20 acres) is currently under cultivation for hay and grass. I will be bringing my thoroughbred horses (brood mares, fools and yearlings) to this specific location as planned. Lot 1 will stay A-1-10 for the immediate future, while we transition ourselves from Spokane to San Diego. This will take at least one year. Adjacent to Lot 1, above the toe of Santa Monica Ridge is a dedicated equestrian trail. This easement was granted to the city as a condition of the Subdivision map. There are no other trail easements granted. This 10-ft trail easement must be graded

Response

336. These comments regarding the history of Lot 1 of the PRD are noted.

337. The MEIR and Subarea Plan indicate the general location of detention basins which may be necessary to accommodate runoff from the project site. At the time future development proposals are brought forward, detailed drainage studies and appropriate hydrology/water quality measures would be required to the satisfaction of the City Engineer.

I have no intention of contributing any of the land to the MHPA. In fact, a cursory review of the MSCP plan that I reviewed in the Carmel Valley shows this area and others as not in the MSCP and was in a developed state

338 We will be demanding that McGonigle Valley/ Canyon be continuously farmed to the east and west as it has been since the Bear Flag Republic and possibly during Spanish Rule. This will be our insurance regarding fire control. Also dirt roads for fire trucks, etc. must be established and maintained. Under no circumstances should revegetation take place. There exists a slide next to and on the Pardee property. Again, this occurred in 1981 and appears on my 1983 tape.

339 d Remainder Parcel 4, Ex. Map 12477. 113 acres. Pardee proposes to place this in the MHPA. This will remain A-1-10. This is not acceptable and I have no intention of ever contributing any of the land to the MHPA. This will remain A-1-10 with no public access. Except for the southeast slopes of Santa Monica Ridge all of it is in the Coastal zone. A certified EIR for this property was completed and approved in 1989 by the City and State. A substantial amount of Negative Biological and Farming open space easements were granted to the State and to the City in accord with the EIR and conditions of the Subdivision Map 12477. All landforms and biological sensitive areas are permanently protected and without any cost to the citizens of San Diego. I still have the burden of property taxes and the maintenance of these preserves. These preserves are consistent with the goal of the MHPA.

340 In a detailed review of your last DEIR for Route 56 I noticed that the MSCP boundaries left out parts of my property that is physically located on Del Mar Mesa and abutting Mr. Goodell's subdivision (which by the way we never received notice

Response

338 Comment acknowledged.

339. See response 330 above

340. See response 330 above

from the city or Mr. Goodell. I am informed that Mr. Goodell's subdivision has been approved however. His subdivision land-locks that portion of the property abutting his

Mr. Goodell and Mr. Coopersmith has promised to make the necessary corrections prior to his transferring the proposed subdivision to the new owner

341 Paulee's proposal has failed again. Also, the MSCP map that I reviewed at the library shows developed areas in this 113-acre parcel. Nowhere do I see a yellow area to accommodate the Route 56 alignments that have been in existence prior to any MSCP or MHPA. This cannot be. Route 56 has been in existence before the annexation of the land into the City (1962). Annexation took place in 1964.

342 The SE facing slopes of Santa Monica Ridge and Cordero Ridge are a major resource as explained before and must be in the RPO, it is just too valuable of an asset for zero energy structures.

343 Another significant resource is the existence of mineral resources MRZ-2 on half of Santa Monica Ridge and Cordero Ridge. According to the MHR (pages 315-316) significant mineral deposits of MRZ-2 are present and that there is an anticipated 60 million ton deficit of PCC aggregate through 2030

These resources are extremely important to the zero energy structures as larger amounts of concrete are needed for the earth integration and the trombe-walls.

Now I have made a copy of your figure 4.1-2, mineral resource zones. Please note that the southerly alignment that I proposed for Route 56 is through this resource area.

17

Response

341. Comment acknowledged.

342. This comment on the history of the State Route 56 alignment and the relationship of the alignment with the establishment of the MSCP is acknowledged

343. Comment acknowledged

PR-157

Do you fathom what this means? There will be enough aggregate to help pay for Route 56. Mining operations can go on prior to completion. Therefore the Route 56 alignment in Carroll Canyon/ Ridge is the most optimum and will further conserve of the shortage of this material. You must place this alignment as the most economical as well as resource oriented. I do not know how far the Carroll Ridge MRZ-2 deposits go east of SR11. I believe, they will extend all the way. If so, than a tremendous cost savings will occur and the excavated material will alleviate the shortage predicted by 2030. In short, there will be enough base and enough concrete for Route 56! Am I missing something? Therefore, there can only be one alignment for Route 56 – This I have previously proposed in 1990, 1996 and again and again. I will be transmitting this information to all concerned and, the City had better be ready to respond and to provide a competent, nonpolitical comparative analysis. It is just too damn important. All this information is in front of your faces. Am I missing something?

344 As for farming I intend to keep on and go into grass, hay, horses, some corn, etc. There is a significant shortage of hay in California and most of it is being shipped in from Utah and Arizona. As for irrigation I intend to fire up the old well and put on a couple more. Also the permanent location of the growing grounds for Rancho Del Sol Nursery will be located on Santa Monica Ridge and other areas. Not all land is suitable- depends on the elevation.

345 The Deer Canyon reservoir is gone and is now a major source of siltation to Penasquitos Lagoon. In order to control this, around four acres of the 16- acre Biological Easement needs to be converted back to agriculture. I will be applying for this change with the Coastal Commission and I am reasonably certain that it will be granted. At its present state, it is a problem. There is an area left where water has

Response

344. These comments on the Central Alignment for SR 56 and mineral resources within Subarea III are acknowledged.

345. Comment acknowledged.

ponded and large wide mouth bass are still alive. Mr. Wallace a resident of the PRD has taken it on to himself to move the fish to another lake

We will be expecting that the farming areas east of Rancho Del Sol will remain to protect against Santa Ana wild fires

Please refer to the figure showing all the possible SR-56 alignments through this parcel

346 The MSCP/MHPA has failed to provide for any of the middle proposed routes and as such to flawed the existence of Route 56 has been known since 1962. The city annexed in 1964. The FHA was created in 1974 with the 1962 alignment in place. In 1985 it was moved to the toe of Santa Monica Ridge. In 1995 I identified the Cordero Canyon alignment. In 1996, 97, and 98 I validated this alignment as the most viable and with the least environmental impact. Now, with MRZ-2 deposits this must be the route taken.

347 I present to you page 118 of the MEIR. This is quite interesting as it demonstrates the short sightedness of this document.

Issue. Yes it would because once in never out and the construction industry will be short, impacting the required sand, gravel and aggregate at great expense to the future residents of the area.

Impacts. There were existing mining operations in the overall area. There used to be a sand and gravel plant and ready mix plant. These are all gone as a result of the

19

Response

346. Comment acknowledged.

347. See response 343 above.

development of Carmel Valley. There has been no replacement. Pacific Highlands Ranch is but one area of the FUA.

Of the 116 acres of designated MR/2 zone lands of which we are part, the deposits are identified as a source of aggregate which will be required locally. The cost of housing must be kept down! How in the world do you, the City, demand low cost housing and at the same time create a shortage of the basic materials for construction?!

Pardee's proposal of incorporating Rancho Del Sol 115 acre parcel is ludicrous and we will not allow it to happen. What has happened to common sense? Even the most prudent environmentalist would laugh at this proposal. Can you fathom the amount of pollution from the trucking in of materials, the wear and tear of our overburdened freeways and roadways, etc. and etc.

Precluding the reasonable extraction would be a travesty.

348 Consider Route 56 and its needs. The base required, the concrete required, and the excavation and grading required. The statement of significant impacts is played down. There is a history of mining activities in the FUA which have been shut down. There will be no intent on the part of Rancho Del Sol to keep this resource in perpetuity. How can the writer of this paragraph conclude that since they would be retained in perpetuity as open space areas that there would be no potential significant direct impacts (or anticipated). The person who wrote this should be summarily fired. I request an investigation of this area and further request that Mr. Frank Belock, the City Engineer be deposed as to why the Barrazewski Southerly Alignment is "fatally flawed". We are talking about millions of dollars in savings to the tax payers and

Response

348. The draft EIR concludes that the inability to mine mineral resources under the proposed projects is a significant cumulative impact. Only adoption of the No Project alternative would eliminate this potential adverse effect.

future residents. I further request an economic analysis of the situation. Certainly something is not adding up and we the property owners in the area are being kept in the dark. What is the hidden agenda?

The value to Route 56 is enormous and Cordero Canyon is pointing the way.

349 I just hope that I have not incensed anyone in the City as most of you know that I have allot of respect for it's staff. I intend to obtain a permit to initiate the partial mining of this resource without impacting the land. You all know that I have been very prudent and a good steward of the land. There is just too much at stake to allow any further restrictions. Let common sense prevail. Route 56 must go through to keep you, the City, out of State and Federal courts. All resources and efforts must be concentrated in accomplishing Route 56. Without it, Penasquitos and Carmel Valley is shut down. Also, there is a growing hostility towards the City. There are talks of "de-annexing" or "detachment" due to apparent mismanagement or failure to communicate. Before closing comments on this 113 acre parcel there are more items that are required. You must show access from the west across Pardee property to Rancho Del Sol. This must be a 60 ft. ROW so that we are not impaired in any way.

350 Regarding the sensitive plant species: As you know we are a commercial nursery with major facilities and talented personnel. We can in fact grow any of the sensitive plant species. Will the City of San Diego purchase them in quantities of thousands of flats? I have always been intrigued about these indigenous plants. But, is there a market? As for the remainder of this parcel, the fire of 1989 was so intense that the south side of Cordero Ridge was totally incinerated. 150+ year old barrel cactus stands were totally done in. My investigation and reconnaissance of this area established that there

Response

349 See responses 343 and 347 above.

350 These comments on SR-56 are acknowledged.

had been no fires in the past 20(k years. There is not much left and therefore, Gerdes Canyon is quite available for Route 56

351 Concentrated runoff from upstream development appears to have collapsed the Deer Canyon reservoir. It is now a major source of siltation. Remedial work needs to be performed and the City needs to concentrate on flood control and perform more hydrology studies

352 This 113-acre parcel is part of the Rancho Del Sol Subdivision Tract Map 12477, Recorded 10-89. It has two 8-inch water lines to it and access to the McGonigle trunk sewer via two existing 8 and 10- inch sewers. It is landlocked and requires public street access to the west although it has prescriptive rights as a result of farming operation and existing dirt roads above and below Santa Monica Ridge. Part of the property is topographically part of Del Mar Mesa and abuts David Goodell's development

353 Mr. Goodell/ Latitude 33 and the City failed to give us notice and the benefit of the various hearings, and review of their EIR, hydrology, grading, streets, etc. Portions of this property is not even in the MSCP. I notice that the source of maps and info is Latitude 33 planning and engineering. A detailed inspection of Figure 3-4, Regional open space plan (MSCP) shows the boundary of Subarea III not including several acres of this parcel at the south

As a result, we demand a hold on Mr. Goodell's final map until we assess the impacts to our land. I already know that his subdivision will be dumping runoff water on our property, and that they have not provided us access to the public roads. I also need to know the location of public utilities and the like. They are also planning to grade our

Response

351. Any revegetation done to establish mitigation credits within the MHPA would be accomplished pursuant to the Conceptual Revegetation Plan prepared for the draft MHR and per a Master Revegetation Plan as part of the Subarea Plan.

352 See response 336 above.

353 This comment on the relationship of the subject property to another subdivision within Subarea V is acknowledged

property. We understand that the approved subdivision is in the process of being sold. We need to give notice to them of our intent to provide another SR 56 alignment below Del Mar Mesa. As for the adopted framework plan we again did not receive notice nor had the opportunity to address the City Council. We did learn after the fact that the Mayor and some members of the City Council considered it unfair to the small property owners and favored Pardee, but adopted it for the lack of anything else.

354 The MSCP and MHPA plan was not provided to us for review. We have not had the opportunity to review and comment. We again did not receive notice of the plans. I have heard that there is a procedure where an adjustments to the plans can be made. Please provide us with the City of San Diego notice package. Three sets to.

Sandra L. Barczewski, Trustee
8222 South Ramona Rd
Spokane, WA 99224

Robert D. Barczewski, Trustee
6561 Black Mountain Rd
San Diego, Ca 92130

Zero Energy Systems.
Same as above

As presented I consider the MSCP as a "land take". It is in my opinion this is a violation of the U.S. and State Constitution and may be in conflict with existing City Charter, ordinances and codes. It also appears to be an intent to take away agriculture and future development rights. It is in conflict with the General Plan, the FUA language and City Council Policy 600-29

Response

354 Figure 3-4 is intended to generally illustrate regional open space.

What ever the case, we have established many acres in farming and biological preserves in accordance with 606-29. A certified EIR is on file. The remainder of the property must be considered for urban development as planned and established by the subdivision map 12477

Route fifty-six

355 The figure shows the various Route 56 alignments through Rancho Del Sol. All possible alignments go through the property. As an affected property owner with substantial knowledge of the land the most environmentall sensitive is the 1993 alignment that I had proposed to Caltrans. Please refer to my letter to the Planning Commission

In 1985 the city staff and I agreed to eliminate the 1962 alignment in order to save McGonigle Canyon Valley and Santa Monica Ridge. We then placed it next to Deer Canyon at the toe of Santa Monica Ridge. In 1996 the City (Hetlock Alignment) moved it up Santa Monica Ridge. This is currently referred to as the Central Alignment. It wipes out much of Santa Monica Ridge, particularly the SE facing slopes which is a Major Resource as previously explained

The 1998 alignment alternative resulted from the demise of the Deer Canyon Reservoir and provides for a more superior alignment without affecting the Santa Monica Ridge slope. However it does present a future problem with regard to future development

Response

355 The MSCP was adopted by the City Council in March 1997 and copies of the MSCP and descriptions of the boundary adjustment process are available at the City of San Diego. The public comment period for the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) ended on October 15, 1996, and therefore there are no public noticing packages available. However, the EIR/EIS (Log No. 93-0287) is available for review at the offices of the Land Development Review Division at the address noted above.

The E393 alignment is the most superior of all, having natural topographic barriers and substantially less environmental impacts. It does not affect any vernal pools and will be scenic. More important, it can accommodate expansion to 8-lanes or more as desired by Caltrans and the City Engineer. The recent findings (MEIR info.) of the existence of significant high quality aggregate (MRZ-2) deposits (and extending to the east) makes this alignment completely and clearly superior. It will save the taxpayers of San Diego millions of dollars and will actually help the environment, promote farming and preserve farmland. The material excavated will be used by the highway and what export is left will be utilized locally.

Page 316 of the MEIR states: Based on a total projected Portland Cement concrete (PCC) demand of 360 million tons of aggregate and assuming that all PCC quality material will be used, there is an anticipated 60 million ton deficit of PCC aggregate through 2030.

It therefore appears that to alleviate this shortage, SR 56 must go through Cordero Canyon. I do not have a handle on the quantities that are involved, but based on the info given and assuming that there is a deposit 8,000 ft long, 30 feet deep along the ROW compute out to be

350 feet width X 30' depth X 8,000 feet = - 2,896,500 cubic yards or 5,791,100 tons

This would help the shortfall by 10% and would provide future access to the deposits for the development of the various subareas. In addition, aggregate, sand, gravel and concrete processing plants can be located within a very short distance to the various developments and result in very short trucking distance which would in turn lower costs, lower emissions and therefore lessening to a small degree global warming.

25

Response

There will also be less need to create sand pits in areas that are classified as wetlands Obviously, I do not know of all the facts and ramifications. However, I do know that tremendous savings will occur and that we will be keeping our own dirt etc. in "our own backyard"

Perhaps this is an answer to Mr Frank Belock's problems As I recall he has the problem of providing over 8 lanes of freeway. Now it appears that this is more than feasible. I am sure that all sorts of negatives will be thrown up However, I believe the positives will greatly outweigh the negatives.

Who ever got this MRZ-2 info in the MEIR must be complemented because of the importance to the Route 56 Dilemma. No one is happy with the other alignments Now everyone should be happy with this one Just think of the millions of dollars that it would save As for mitigation, I believe that this approach is self-mitigating, except of course for the required plantings, dust control, etc

356 Moreover, there will now be the possibility of more permanent reservoirs. Then there is the total preservation of Deer Canyon and it's water shed

As far as the MHPA / MSCP is concerned – They are only a plan that is on shaky economic and legal ground They are not law They are after the fact. Route 56 alignment has existed since at least 1962 Annexation into the City took place in 1964 The General Plan and all the other adopted plans call for Route 56 to be in this southerly corridor. The MHPA and the MSCP must take a back seat or be placed on the endangered list or in the trash can It is reaching too far

Response

356 These comments on SR-56 are acknowledged

The MHPA also endangers wildlife, private property, farmland, and farming rights. It is setting up the enormous probability of huge wild fires that endanger the lives of people and property. As I said before, I have seen two large ones in the last twenty years. Do you know that fire trucks are helpless and that the only effective means are bulldozers? Where will the dozers be when we need them? It was the farmers who supplied them when needed and where close by. farming.

I think that preserving the areas as it did is necessary but not on a wholesale basis and not at the expense of the property owners and the taxpayers. An artificial shortage of developable land had been created. Who can afford to live in the area? You promote low-cost housing and require it. There is no such thing in North County. Lastly, it is un-American. As one person said to me "Bob, I am a liberal democrat from Minnesota. I have never seen anything like this (MHPA/MSCP)".

Needless to say, I will not participate in this ill fated phase shift application. I see no chance for its approval. I will not allow any further land takes. We have already given up at no expense to the taxpayers 50% of the land plus provided public roads, etc. We have a certified EIR. The next take will be Route 56 but we agree with the requirement for it and will be compensated.

As Concerns the MHR's proposed take of prime and semi-prime agricultural land and its incorporation into the MHPA:

359. The write up (pages 307-315) is definitely biased towards land take. It starts of by saying that "agricultural Production has a lengthy history but is not regionally significant". I attach here with my notes and markup of this section. It then goes on and states that agricultural pursuits in the area overall are diminishing and only discusses this in terms of vegetables. Next it identifies that only 136 acres are prime farmland and which are

Response

359. The MSCP is approved and adopted by the City of San Diego and is used within the City in its permit decision-making process. It is anticipated that the California Coastal Commission will review the MSCP and consider its adoption sometime in 1998.

located in McGonigle and Deer Canyon (figure 4-1-1). It then finally admits that 14% of the Subarea have high soil ratings. It also eludes to the fact that 48% of the area is economically farmable and that most of it is being farmed. Finally it states that 52% of the soils are mainly restricted to pasture, range or recreational uses. Then it goes on to state (as required by law): "Conversion of prime agricultural land to non-agricultural land use, or impairment of the agricultural productivity of prime agricultural land is cited in the CEQA as an environmental consequence which may (or will) be deemed to be significant. (State Administrative Code, Section 15064). Also defined in the California Government Code, Section 51201, Williamson Act, LAFCO guidelines, etc., etc.

3582 This section of the MEIR fails to identify and include the horse industry in the overall area including Rancho Santa Fe, etc. Horse breeding and raising is agricultural and is huge. Did you know that we have the largest population of horses in the United States? We are breeders of thoroughbred horses. We also raise them. We also have a stable of horses of racing age. We are members of the California Thoroughbred Breeders Association and are licensed to race in the State of California, Washington and Arizona. I will be contacting the State and the various associations to inform them of what you are up to. Your plan to convert prime farmland and pasture land into habitat will not succeed. It is ludicrous and a waste of the taxpayer's money.

3593 I want to bring your attention to page 308 (my markup) entitled, "Important Farm Lands". I have drawn in the boundaries of Rancho Del Sol. All of McGonigle Valley, Deer Canyon and portions of Cordero Canyon is prime farmland. Lot 1, 20-acres, over half is prime. The same for Lot 35. The 113-acre Parcel except for the steep slopes of Santa Monica Ridge and Cordero Ridge, all of it is prime. In addition, these Ridges contain another prime natural resource – MR7-2. Therefore, this entire parcel is prime

Response

358. The draft EIR concludes that the loss of important farmlands under the proposed project is a significant direct and cumulative impact. Only adoption of the No Project alternative would eliminate this potential adverse effect.

359. It is acknowledged that pasture land for horses is considered agricultural. Its loss is included in the draft EIR conclusion mentioned in response 357.

and cannot be incorporated into the MHPA (except for the biological preserves under protective easements).

In answer to the question posed in part 4, section 1 of the MCIR "Would implementation of the Pacific Highlands Ranch Plan result in the conversion of agricultural land to nonagricultural uses or impairment of existing agricultural land to non agricultural productivity?" I answer Yes, The MHPA would convert it to habitat and create enormous fire hazards. And then the next question, "Would implementation of the project result in the prevention of future extraction of sand and gravel and/or mineral resources?" Again, Yes, it will make it impossible.

The selection of the 1993 Central Alignment for Route 56 will be conducive to the preservation of prime farmland and other natural resources. Designed properly, it would also provide the necessary access and other infrastructure to help promote its use. In addition, it would serve as a dividing line between the true preserve area (Del Mar Mesa and Penasquitos Canyon) and the agricultural oriented area surrounding the planned urbanizing areas. Biological and wildlife areas would still be interconnected but to the extent where prime or near prime farmland is implemented.

I have been actively engaged in agricultural pursuits over the years and have become very experienced in managing farmed areas and wildlife/ biological areas in the same ownership. Most of the time they go hand in hand. One does not have to foreclose the other out as I have experienced with Poplar Gate Farm here in Spokane, WA. We have 25 acres of grass/ alfalfa bordered by areas of pine forest. The house, paddocks, pens, barns, turnouts, arenas, orchards, residences are on the other 25 acres and which are bordered and interspersed with large pines and natural wild life and biological habitat. We provide water, salt licks and other grass areas (in the rockier part). The end result as

Response

my pictures and videos will validate is a farm/ranch that is returning with wildlife and birds

For example, living on site is about four white tailed deer, occasional large coyotes, porcupine, an occasional moose, elk in certain seasons and red deer. The birds are varied and profuse as well as seasonal. Year around we have 200 covey of different varieties of quail and game, pheasant, red-headed wood peckers (next to the house as well), two breeding pair of hawks (redtail and other), magpies, etc. Birds of prey are currently nesting (about four nests).

The alfalfa field is open and fresh running water is provided year around. Large mammals come and go as they please because we do not allow total fencing of the perimeter. The adjacent owners have portions of their fields in wheat and oats. In the fall and winter hundreds of geese and duck arrive. Swallows even migrate here in the thousands. No hunting or shooting is allowed. The birds and quail integrate with the horses in the pastures and paddocks. There are also 4 barn cats and two dogs. The cats keep the rodent population under control and out of the barns and feed rooms.

c. The northern parcels that are clear of the MHPA proposal are:

360 E. Sandra L. Barczewski, Trustee. 2 Parcels divided by dedicated 60' wide Santa Fe Farms Road totaling 28 acres net. Under intensive agricultural use continuously since the 1880's. Contains one residence and substantial nursery infrastructure and buildings. Wholesale and retail nurseries. Production of color plants, groundcover, palms, ornamental trees and shrub. the Rancho Del Sol Nursery is the only wholesale nursery left in the area. Evergreen, a retail nursery, will be moving to Oceanside.

360. See response J57. The portion of the comment's preference for the Central Alignment for SR-56 is acknowledged.

Response

2 Robert D Barczewski, 1 Parcel, 6 6 acres

In 1998 as part of the Rancho Del Sol Subdivision conditions, urban infrastructure including 10" and 8" sewer, double 8" waterlines, public street expandable to 92 feet (4 lane) with concrete curb and gutter and storm drains were constructed 8" and 4" water main laterals, several water meters (2" and 1") are available to each of these parcels Also fire hydrants and street lights Extensive and beautiful landscaping was installed. Mature trees and shrubs line the streets

The highest and best use has been identified in the past and present as neighborhood commercial and mixed use The property is not to be sold and is for the generation of income for the benefit of Sandra Barczewski in her lifetime and the two primary beneficiaries R Christopher and Marci Ann Barczewski and posterity The land can be developed for income but not sold unless circumstances require.

These properties are covered and governed by certified EIR and the Rancho Del Sol Subdivision Tract Map development conditions as executed in 10/89

361 The phase shift/ GPA application of April 1985 still stands The proposal is for the development of an alternative transit oriented village similar in architecture to Rancho Santa Fe but employing alternative architecture, grading and landscaping Heat and water recycling and incorporation of alternative energy conservation techniques, apparatus, etc., etc. A substantial effort and resources were expended, not including the R&D effort that was accomplished in Palos Verdes

Sandra Barczewski's parents are Edwarta McDowell (deceased) and Paul McDowell. Both long-term residents of San Diego Edwina was employed by the City of San

361 See response 330 above

Response

Diego for a long period, she was the secretary for Mr. Ed Gabrielson, City Engineer and after his retirement became the first woman building inspector for the City of San Diego. Paul, was the chief operating officer/ V.P. for Trepte Construction Company. Both retired and moved to North City West, purchases one of the first few houses from Pardee. Marci Ann also lives in a condo purchased from Pardee. Since their retirement, the McDowells and Gabrielsons have remained social friends.

Out of respect for the City, her parents and the Gabrielsons' Sandra Barczewski will not stand in the way of the City's crucial need for a Route 56. Therefore, although she does not like Route 56 crossing her property and destroying and impacting what we have established there, she has established a corridor on her land for this crossing. This detailed info was sent to you and I will not repeat it. She is opposed to anything further north on her property and will in fact file suit to protect her interests. All Alignment D, Modified D and Modified F, as far as she is concerned, are one and the same. The analysis we did on these crossings specifies the exact crossing/ alignment and that would be at least cost and damage. There will be mitigation for Rancho Glens Estates and this will be taking Lot 27 and 26 out of the PRD and adjusting and reconstructing the entranceway. The land could revert back to the subdivision and the original owners in turn for credit towards the land take that is necessary for the freeway. Other mitigation would be to shift the alignment 1,000 feet west before coming into Rancho Del Sol. This, however, is assuming that a southerly/ central alignment is not politically feasible for the City at the present. Also, this assumes a four-lane plus expressway and that all future lanes would be accomplished in the south a decade or so from now. As for the other prime arterial (Carmel Valley or Del Mar Heights), we are assuming that the City Engineers (1982) successor, Mr. Frank Belock will stipulate to the realignment of existing Black Mountain Road and the removal of the "S" curve and be aligned along the parcel property lines which are

or incident with the centerline of the forty foot Del Mar Pipeline Easement, or be placed at the northern boundary and terminating at Rancho Santa Fe Farms Road. This would allow for the future 4 - 6 lane prime arterial at either location. For some reason, Pardee will not listen or incorporate this requirement. This is specified in my subdivision map conditions. Furthermore as a condition of this "safe corridor" alignment and the identification of Carmel Valley prime arterial to be located north, we expect the immediate vacation of the temporary non-building area easements and slope easements that were imposed on the subdivision. This pertains to Lot 31, 13-18 and 19-22 of the PRD.

362 Pardee's proposal calls for peripheral Residential on the two largest parcels and, low density on the north parcel. This is not acceptable as previously explained. We are planning a village around the commercial on the entire property. We have provided detailed comments and documents to Latitude 33. None have been incorporated. They cited the City as the culprit. Please refer to Cathy Winterrowds letter to Latitude 33. She is providing direction to them: "Barczewski: show framework plan land uses and corresponding zoning, do not include a second commercial zone on this property, include the existing development area, show the MHPA consistent with the adopted MSCP Subarea plan." Finally she says "provide all property owners with a copy of the proposed Subarea plan for their review and comment."

I Since she is the project manager in the City for this Subarea, is she not responsible to insure the earliest communication of information to all affected landowners? She has not done this. All the people around were kept in the dark. The only reason I found out about this was a very late City notice. She, Pardee and Latitude 33 has purposely with held information. She shall be held accountable for this

Response

363 The status and history of the referenced General Plan Amendment application of April 1985 is acknowledged.

action. We did not receive any prior notices on the other matters over the last few years

In the MHR, there is mention of a Pardee settlement agreement with the City. It is not provided. We all demand a copy of this agreement since it does effect all the other properties, public safety, health and welfare, etc.; As well as the proposed taking of land

2 "Framework plan uses and corresponding zoning" are something very new to us. We have not been noticed and have been deceived by the City of San Diego. Where are the density transfers, etc., etc.?

3 Do not include a second commercial zone on this property. We are not asking for a commercial zone. We are demanding, based upon long term planning and prior applications a village orientation to serve the greater San Dieguito planning area. We are part of it and the City does not even recognize this. We identify with the greater Rancho Santa Fe area and will continue to do so. There has always been a need for a village center for the past 20 years. There is a shortage. Therefore, we do not understand her and Pardee's problem. Again, we are the first on the block-executed subdivision, urban infrastructure, commercial infrastructure, and so on. Perhaps Cathy is too used to extreme high density and cookie-cutter homes. We must preserve what is left of our living environment and this is certainly not what is proposed by Pardee. Frankly, although Pardee serves a good purpose, they and the City have failed to recognize our past planning and development efforts. Pardee wants mass grading and manufactured slopes. We don't. Pardee wants heavy concentrations of housing and a get in and out type of construction. We

Response

Response

don't. Pardee wants to destroy natural drainage courses. We don't. Pardee wants to place highways in the North. We don't. I can go on and on

It's been said and I am beginning to believe that Pardee has controlled the City's Planning Department for the past twenty years. I can say that I now believe this. They just go ahead and do what they want to accomplish the various developments that they are planning in all areas- in and out of the FUA. General Bull Mouse has gone too far. It is now time for the city to take time to fathom the huge problems that are festering to the East (Penasquitos) and to the West (Carmel Valley). It appears to me that the city must place a 2 year moratorium on all residential construction in these two areas. We are being punished for the sins created in these two areas. Cabrera is mentioning a 2 year delay of any construction of Route 56 Central segment because of such it will cause 15 – 30 minute pile ups at Carmel Valley I-5.

With the above in focus, does it not seem more sensible to create areas of commerce, etc. To offer businessmen (and women) an alternative to La Jolla Village, Downtown and even Carmel Valley. My God, we are having some problems just getting over to the Del Mar Race-Track and Red Tractors Restaurant

4 "Include the existing development area". Well this is not acceptable. This is against the concepts of the General Plan, etc., which I will expand on later.

5 "Shows the MHPA consistent with the adopted MSCP Subarea Plan". This has not been done. In fact, the MHPA plan by Pardee is a forgery. They have concocted 100 year flood plains boundaries based upon their runoff (mass grading on the northeast), proposing to inundate Lot 1, 2 and 3 and other areas and then,

establishing an MHPA boundary based upon this. What do you think of this? Is this a forgery? These are heavy accusations, but I have the proof. Will Cady Winterrowd be able to withstand a searing deposition. Well, she had better be prepared for one. Her failure to communicate with us is not acceptable. Who does she work for? The City or Pardee? We will not mince any words when it involves anything to do with her proposed MHPA. A simple comparison with the original proposed MHPA (which we were not notified of a few years back) and the current one will show glaring differences. She is just allowing Pardee to do what it wants.

Therefore, I see no alternative but to recommend to the City that she be removed as a project manager for Subarea III. There have just been too many infractions, the main one being not being available to other affected landowners, smaller or larger, NOT Pardee.

363 On other issues, we are opposed to their circulation plans through Rancho Del Sol NOT ACCEPTABLE. We have provided input to Pardee and Latitude 33, but to no avail.

There is also the elementary school location next to our heavy farming, horticulture and horse operations. This is not acceptable to us or to the Hostet Owner's Assoc (PRD). Pardee has all sorts of more viable locations to the east next to their proposed open space. Also this is not a good idea regarding the PRD and the future intent of my providing a small retirement area.

There are proposed public trails. As mentioned before, this is not possible for reasons said. There is, however, a dedicated 10 foot equestrian trail above the toe

Response

363. These comments regarding the landowner's position on the proposed land use designations for the ownership are acknowledged.

of Santa Monica Ridge. Give me some mercy and I will put it in. I also have other better ideas for the bike paths, hiking trails, etc.

Parcee proposes to wipe out our street (1960 installation) and infrastructure. Since we only see Modified F as the only possibility for the Northern Alignment, I will not pay any attention to the other alignment proposals. We hereby demand that our street remains intact. We will not succumb to Parcee's mass grading proposal and infrastructure as they see it. They must maintain natural drainage courses and grade accordingly. We do not accept any of their proposed circulation. We will dictate to them as what is and what isn't acceptable. I have already provided substantial input.

Finally, I want to relate to you that for years we and other have considered the northern corner parcel known as "Bob's Corner" locally as for commercial use only. There are many, many memories with regards to the balloonists and "Nice Guys" events, etc., etc.

There are many flaws in the presented and colorful aerial photographs depicting the boundaries. The Coastal zone is 550 feet off - too far north. Property boundaries are also about that much off. In short there is not anything in the MEIR that does not require substantial overhaul and newer and more objective sources of information.

Since it is now 3:00 p.m., Sunday and the deadline is tomorrow, I will close.

Response

364 1. Please do not include any of the property that we own that is proposed to be taken over by the MHPA in this proposed phase shift. These are Lots 1, Parcel 3 to the east and 113 acres of remaining parcel 4.

365 2. Rancho Del Sol exists as a legal subdivision. It is not even mentioned anywhere in the document.

366 3. Provide a reservation of 10% of all of Pardee's residential density ad 10% of the proposed commercial for Rancho Del Sol.

367 4. We are totally opposed to the MHPA proposal. It does not even come anywhere close to the original MSCP plan Proposal. The legal grounds for the MSCP is also quite shakey.

368 5. Route 56 should probably be delayed so that we don't rush into a bad situation. Several events and discoveries have occurred as previously explained. It sure looks like the Southerly Modified Central Alignment as I proposed based upon information provided by the MFR is the way to go. Two years seems to be the appropriate delay. A moratorium on Penasquitos and Carmel Valley should also be imposed. It appears that staff in the City must be reorganized. Probably new faces, mindsets, etc. This will be required for you to respond to some very upset residents and landowners in the area. The whole Subarea III will have to be redesigned from the very beginning for it to become a reality. So far it spells G-R-I-F-I.

I apologize for not having the time to edit my own writings. Therefore consider it as a rough draft. Again, I am trying to keep things in proper perspective. It is hard to do when your own neighbors are upset and have litigation against the phase shift proposal and Route 56 specific alignments.

I just hope that I have conveyed sufficiently the information on what the areas of trouble are

Response

364 All noticing for the proposed project has been done in accordance with local and State requirements. The references to the "Pardee Settlement Agreement" on pages 83, 105, and 106 of the draft MFIR are taken from the City of San Diego's MSCP Subarea Plan (Item C-19). This document is available for review at the offices of the Land Development Review Division at the address noted above. For information on the settlement agreement, please contact MSCP staff at the Community and Economic Development Department, 202 C Street, Fourth floor, San Diego, California 92101.

365 The North City Future Urbanizing Area Framework Plan is a document for guiding the City in its achievement of community goals and objectives. The Framework Plan identifies broad goals and policy statements to be used in evaluating future planning efforts in the Future Urbanizing Area. The specific subarea plans are land use plans that, by their nature, amend the Framework Plan for the subject subareas.

366 Comments acknowledged.

367. Comment acknowledged.

368. The City of San Diego's MSCP Subarea Plan contains provisions for Boundary Adjustments. The Boundary Adjustment that has been proposed for this project is the result of discussions among the City of San Diego, the United States Fish and Wildlife Service, the State Fish and Game Department, conservation groups, and the applicant, and does not reflect any independent actions on the part of the City's Subarea Plan Project Manager.

I have seven yearling thoroughbred horses that I will be running soon. Since I have been so engrossed in the matters concerning us I have decided to submit names to the Jockey Club as follows. Keep in mind that I own a stallion named "Dave's Reality" by his famous sire "In Reality."

1. Route Fifty six
2. Fifty six Realities
3. Phase Shift
4. Phase Shift Reality

There are two colts and five fillies all by Dave's Reality. They will be running mid July of 1999. It will be interesting to see who runs first, the horses or the developments. Hopefully we will all be relocated to San Diego by that time.

Respectfully Yours,

Robert D. Barczewski

Robert D Barczewski

Cc: Mayor Golding
Louis F. Goebel, Esq
Alan Paterson, HOA
Frank Belock, City Engineer
Mrs. Beatrice Beck
Mr. & Mrs. Zurcher

LMA

LETTIERI-MCINTYRE AND ASSOCIATES, INC.

May 26, 1998

Ms. Eileen Lower
City of San Diego
Development Services
LAND DEVELOPMENT REVIEW DIVISION
1222 First Avenue, MS 501
San Diego, CA 92101

SUBJECT: PACIFIC HIGHLANDS RANCH (SUBAREA III) SUBAREA PLAN EIR

Dear Ms. Lower:

369 As a supplement to Jeff Lee's letter dated May 18, 1998 commenting on the Pacific Highlands Ranch Subarea Plan EIR, I would like to request that Figures 3-7 and 3-10 in the Final EIR be revised to be consistent with the revisions to be made to Exhibits C-1 and C-2 in the Subarea Plan. We have been working closely with Cathy Winterrowd in Community Planning for several months on the location and design of the north-south "Neighborhood Parkway." Although the design and location are correctly shown in Figures 3-1 and 3-2 of the EIR (and Exhibits 2-1 and 2-2 of the April 3, 1998 Draft Subarea Plan), the revisions to Exhibits C-1 and C-2 in the Subarea III Plan have not been completed to reflect the MSCP encroachment for the final location of the Neighborhood Parkway. Cathy Winterrowd indicated that the MSCP preserve encroachment for the Neighborhood Parkway is going to be designated as a "City" modification in the Final Subarea Plan.

Although the public review period is officially over, I wanted to follow up with a separate letter on this issue to ensure that the appropriate revisions get made to Figures 3-7 and 3-10 of the Final EIR, as well as in the Exhibits C-1 and C-2 of the Final Subarea Plan. Thank you for your assistance in this matter.

Sincerely,

LETTIERI-MCINTYRE AND ASSOCIATES, INC.

Debbie Collins

Deborah L. Collins, AICP
Senior Project Manager

cc: Cathy Winterrowd, Community Planning
Jeff Lee

[illegible]

[illegible] Fourth Avenue • Suite 300 • San Diego, California [illegible]

Response

369. Figures 3-7 and 3-10 of the draft MEIR will be revised in the Final EIR to be consistent with Exhibits C-1 and C-2 of the Final Pacific Highlands Ranch Subarea Plan.

PR-180

Executive Summary

A. Introduction and Project Background

The North City Future Urbanizing area (NCFUA) Framework Plan was adopted and the final EIR for the Framework Plan (DEP No. 91-0809) was certified by the San Diego City Council in August 1992. The Framework Plan is a land use policy document that provides general guidelines for development of the 12,000-acre NCFUA, within which Subarea III is located. The City's Progress Guide and General Plan was amended to incorporate the Framework Plan at the time of its adoption. However, pursuant to the 1985 Managed Growth Initiative (Proposition A), portions of the Framework Plan are not effective until a majority of the voters of the city approve a shift from the Future Urbanizing phase to the Planned Urbanizing phase.

The Framework Plan divides the NCFUA into five subareas, requiring the preparation and approval of detailed subarea plans before development can occur. The purpose of the proposed Subarea III Plan, now referred to as Pacific Highlands Ranch, is to establish a land use plan and an open space system which comply with the requirements of the Framework Plan for the NCFUA and other relevant City plans and policies, including the adopted Multiple Species Conservation Program (MSCP).

To date, subarea plans have been approved for Subareas IV and V, and one is currently being prepared for Subarea I. Based on the Managed Growth Initiative of 1985, all proposed subarea plans and associated phase shifts to the "planned urbanizing area" will require a majority vote of the people.

A draft subarea plan for Pacific Highlands Ranch was proposed in 1993 which included 6,500 dwelling units, 400,000 square feet of commercial and office use, and associated public facilities and transportation network. Because of the uncertainties regarding State Route 56 (SR-56) and the failure of a July 1993 ballot measure which would have resulted in a phase shift of the entire NCFUA, the above Pacific Highlands Ranch planning efforts were put on hold.

Subsequent to this initial planning effort, four individual projects within the original Pacific Highlands Ranch have been approved. These projects include the Del Mar Highlands Estates Planned Residential Development (PRD), Pet Facility Conditional Use Permit (CUP), Barne Parcel subdivision, and Seabreeze Farms. A PRD/vesting tentative map (VTM) was approved for Del Mar Highlands Estates in April 1997 consistent with the underlying zoning. Because a phase shift was not required for Del Mar Highlands Estates, this 389-acre property remains in Pacific Highlands Ranch. The Pet Facility

CUP was approved in 1996 at the southwestern corner of the subarea in Carmel Valley, and the subdivision of the Bame Parcel (four units) consistent with underlying zoning was approved in 1995. The 72-acre Seabreeze Farms project was approved by the City Council in July 1996, and a phase shift to Planned Urbanizing was approved by the voters in November 1996. The Seabreeze Farms project area on the western boundary has been excluded from the current Pacific Highlands Ranch boundaries.

With the removal of Seabreeze Farms from the boundaries of Pacific Highlands Ranch, the proposed Pacific Highlands Ranch project area now consists of approximately 2,652 acres within the overlying NCFUA. The majority of the subarea consists of undeveloped land, with agricultural uses occurring over much of the site. The proposed subarea plan would refine the existing NCFUA Framework Plan by proposing specific locations for roads and siting and land use designations for future commercial, residential, and public facility land uses. The adoption of a subarea plan is a prerequisite for voter consideration of a General Plan phase shift from Future Urbanizing to Planned Urbanizing, and no approvals for specific development under the subarea plan are being considered at this time.

B. Project Characteristics

1) Land Use Summary

This Master Environmental Impact Report (MEIR) addresses two separate land use plans which incorporate two proposed northern alignments for the middle segment of SR-56. These two northern alignments are currently being evaluated by the City in a revised draft EIR released on January 21, 1998. The alignments are based on public input received during the public review of the January 1997 draft City EIR which evaluated two other alignments: a northern and central one for the middle portion of SR-56. All of the alignments would pass through Pacific Highlands Ranch.

Both land use plans illustrate the alignments for major streets and SR-56; pedestrian, bicycle, and equestrian trails; a Town Center and Village area; an employment center; sites for schools, parks, and other public facilities; transit facilities; delineation of MSCP open space, wildlife corridors, permanent open space areas, and urban amenity areas; and design principles ~~and standards~~ for future development. A Resource Protection Ordinance (RPO) analysis and Council Policy 600-40 development suitability analysis has also been prepared for both subarea plans. Both plans are summarized below.

a) Subarea Plan 1 (SR-56 Alignment "F")

As proposed, Subarea Plan 1 includes up to 4,974 new residential dwelling units; a ~~Town Center and~~ Village area consisting of commercial uses, retail uses, ~~community green~~;

high-density residential, and a civic use area; an employment center; three elementary schools; two neighborhood parks; a community park; one junior high and an optional junior high school; two high schools (one private and one public); a public library; a double fire station; and the associated public facilities and transportation network. The limits of development and grading would cover approximately 50 percent of the 2,652-acre subarea. The remaining 50 percent of the site would comprise an open space preserve, including a trail system, which is functionally equivalent with the adopted City of San Diego Multiple Species Conservation Program (MSCP). There would be a potential increase in the maximum number of dwelling units (up to 5,456) should the private high school site, junior high school, and one of the elementary school sites be redesignated for residential uses.

The major circulation element roads consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor. Subarea Plan 1 includes SR-56 "Alignment F" as described in the SR-56 revised draft EIR, which is currently being prepared by the City of San Diego.

b) Subarea Plan 2 (SR-56 Alignment "D")

Subarea Plan 2 incorporates a more northerly alignment for SR-56. This alignment, referred to as Alignment "D" in the SR-56 revised draft EIR, traverses Pacific Highlands Ranch in a diagonal manner and alters the backbone circulation system and land use plan proposed under Plan 1 and the Framework Plan. Figure 3-2 of the MEIR shows the proposed land use plan under this scenario. Subarea Plan 2 includes up to 4,9743 new residential dwelling units; a ~~Town Center and~~ Village area with the same uses described above on the south side of SR-56; three elementary schools; two neighborhood parks; a community park; ~~a community green~~ civic use area; one junior ~~high and an optional junior high school~~, one public and one private high school; an employment center; a public library; a double fire station; and the associated public facilities and transportation network. As with Subarea Plan 1, the limits of development and grading would cover approximately 50 percent of the 2,652-acre subarea, and the remaining 50 percent of the site would comprise an open space preserve which is functionally equivalent with the adopted City of San Diego MSCP. The open space preserve would include a trail system. As described for Plan 1, there would be a potential increase in the maximum number of dwelling units (up to 5,414) should the private high school site, junior high school, and one of the elementary school sites be designated for residential uses.

The major circulation element roads also consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor. However, the transition from Del Mar Heights Road to Carmel Valley Road would represent a more linear west to east route which generally parallels the SR-56 alignment through the site. The intersection of Del Mar Heights Road and Carmel Valley Road would be east and north of the Subarea Plan 1 location and Camino Santa Fe would become a much longer and

more circuitous route south of SR-56. Access to the Town Center and Village area would be via Camino Santa Fe south of the freeway rather than from Del Mar Heights Road on the north side of SR-56, and the Camino Santa Fe/SR-56 interchange would be approximately 4,000 feet northeast of the location shown in Plan 1.

The project's major components are described in detail below for each plan.

2) MSCP Open Space

An important component of the proposed land use plan for Pacific Highlands Ranch is the natural open space system and its relationship to the regional biological open space preserve design. As part of the approved City of San Diego MSCP, a Multiple Habitat Planning Area (MHPA) subarea plan has been adopted for the region, including the project area. The natural open space system for Pacific Highlands Ranch is proposed to establish a system of wildlife corridors and habitat areas consistent with the MSCP. The open space preserves shown for both of the subarea plans discussed below are generally consistent with the MHPA.

This open space design would also be consistent with the open space system described as the "Environmental Tier" in the City's adopted 1991 Framework Plan. The "Environmental Tier" was established in the Framework Plan to preserve and protect sensitive biological resources, floodways, and important topographic features (ridges, canyons, and hillsides). The open space configuration shown under the Environmental Tier, which included the placement of SR-56 along Santa Monica Ridge/McGonigle Canyon, has been superseded with the City's adoption of the MSCP and establishment of MHPA preserve boundaries for Subarea III. The adopted MSCP includes Santa Monica Ridge/McGonigle Canyon as part of a large habitat block extending to Los Peñasquitos Preserve, while SR-56 is shown as extending through the preserve. The natural open space described below under both subarea plans is considered functionally equivalent with the adopted MSCP and would exceed the acreage of open space shown in the Framework Plan's Environmental Tier and would locate much of the SR-56 alignment in the development areas north of the MHPA. The design and configuration of the MSCP preserve open space precludes the need for designing an open space system which uses the Framework Plan Environmental Tier's "habitat protection zones," "biological buffer zones," and "transition zones." This terminology is superseded by formal adoption of the MSCP.

Even though SR-56 is being realigned to largely eliminate impacts to the MHPA, it is important to note that the placement of SR-56 through Pacific Highlands Ranch is addressed and allowed in the adopted MSCP and that impacts to sensitive species and vegetation types are allowed as long as appropriate mitigation is provided. SR-56 is a

project that is covered under the MSCP. Mitigation for the impacts associated with SR-56 is addressed in the revised EIR for SR-56.

In addition to the implementation of the MHPA in Pacific Highlands Ranch, the MHPA boundary adjustment includes properties within the Carmel Valley Precise Planning Area (Neighborhoods 8A and 10) and the NCFUA Subarea V (Deer Canyon and Lorenz Parcel). Lands would be added to the MHPA within Neighborhood 8A and acreage would be removed within Neighborhood 10. Approximately 8.44 acres of Tier II and Tier IIIF habitats would be removed from the MHPA within Neighborhood 10. The acreage within Neighborhood 8A (Parcels A and B) contains largely Tier I habitats. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for Carmel Valley geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. The addition of a relatively large block of mostly Tier I habitat within Carmel Valley Neighborhood 8A would result in a MHPA that would be functionally equivalent ~~superior~~ to that shown in the MSCP Subarea Plan.

a) Subarea Plan 1

Subarea Plan 1 would include a total of ~~1,317~~ 1,297 acres of open space. This total would includes approximately 1,268~~0~~ acres of MHPA undisturbed open space which is functionally equivalent with the adopted MSCP preserve design as described in the City of San Diego MHPA subarea plan. The remaining open space acreage consists of active uses (e.g., parks and schools) and the urban amenity features.

The proposed development area for Subarea Plan 1 would be expanded into the defined MHPA open space boundary by approximately 149.9 acres. Any encroachment into the MHPA associated with the SR-56 alignment is addressed in a separate EIR for SR-56. The encroachment area from the land uses shown for Plan 1 is spread across the subarea and described below:

- Both sides of the east-west urban amenity;
- The north-south urban amenity;
- Gentle slopes above McGonigle Canyon at the eastern boundary
- North-facing slopes above La Zanja Canyon;
- East of the approved Del Mar Highland Estates subdivision and south of the existing off-site Senterra development;

- Along the edges of the north-south wildlife corridor between Gonzales and McGonigle Canyons.

The proposed expansion into the MHPA has been reviewed by all interested conservation and community planning groups. Numerous meetings and site visits were held with these groups (e.g., Sierra Club, Carmel Valley Community Planning Board, and the Endangered Habitats League) in 1997 and 1998 to develop a plan which accommodated regional biological conservation goals.

The natural open space system proposed for Subarea III would establish a system of wildlife corridors and habitat areas. The on-site open space system would preserve the habitats and major wildlife corridors south of SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide a desired northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. This north-south corridor is part of the regional wildlife preserve system and grading (to be revegetated) would be required to create this linkage with undercrossings beneath Del Mar Heights Road. Gonzales Canyon proceeds westerly through the Del Mar Highlands Estates PRD property and drains into the San Dieguito River valley. Undercrossings are proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement. The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also be a component of the natural open space system.

b) Mitigation Land Banks

In order to effectuate the boundary adjustments to the MHPA, a mitigation bank would be established over approximately 100 acres of land within the Pardee ownership in Pacific Highlands Ranch. The bank will consist of disturbed land that will be revegetated in accordance with the ~~master conceptual~~ revegetation plan. Restored habitats will consist of appropriate wetland and upland habitats. The City will direct project applicants needing mitigation in the North City area to purchase credits in this bank, and will accept land from this bank into the MHPA upon purchase of credits by a third party. The bank will be processed and approved expeditiously by the City in a manner that will enable establishment costs to be kept to a minimum.

For areas to be restored, a conceptual revegetation summary which outlines the general criteria and maintenance requirements to be included in a more detailed master revegetation plan for Pacific Highlands Ranch is an appendix to this EIR. Restored lands included in the mitigation bank would be maintained as required in the master revegetation plan until credits are sold and the land conveyed to the City for MHPA purposes. Upon conveyance, the City would assume responsibility for management and maintenance.

A mitigation bank covering approximately 20 acres within Parcel A of Carmel Valley Neighborhood 8A would also be established as a component of the MHPA boundary adjustment process.

Urban Amenity Open Space

The open space system under Subarea Plan 1 would also include approximately 20 acres of "urban amenity" open space that would be located primarily in the upper reaches of Gonzales Canyon. This east-west open space amenity area would be relatively narrow and would be intended to provide visual relief, linear park with recreation benefits, and pedestrian links. The urban amenity will complement the biologically oriented expanses of the open space system by encouraging human use outside the areas where the most valuable natural resources are restored and preserved. This area would not be intended to function as part of the natural habitat system. The urban amenity does, however, protect and preserve the wetland habitat in the upper reaches of Gonzales Canyon. The proposed urban amenity corridor would provide open space links between neighborhoods, public facilities, and activity centers.

Neighborhood Parkway Areas

Subarea Plan 1 includes two neighborhood parkways as integral components of the community-wide system for pedestrian movement. The neighborhood parkways would provide visual relief, recreation benefits, and pedestrian links. The primary neighborhood parkway is a north-south corridor that would connect McGonigle Canyon and the MHPA open space south of SR-56 to the urban amenity ~~and Gonzales Canyon~~ in the north. The neighborhood parkway would be approximately 100 feet wide. The secondary neighborhood parkway would also be approximately 100 feet wide and would connect the ~~Town Center~~ Village to the northern neighborhoods, the east-west urban amenity, and the MHPA open space in La Zanja Canyon. Also, this neighborhood parkway would be adjacent to the neighborhood park and elementary school north of the ~~Town Center~~Village, and would provide future residents an alternative access route to these facilities.

Open Space Trails Systems

Pacific Highlands Ranch would also include a plan for an extensive system of trails within the overall open space system. The trail system would include hiking, biking, and equestrian trails that connect with existing paths within the built neighborhoods. The trails would be located within the MHPA preserve as allowed by the adopted MSCP.

Open Space Overlook (Trail Heads)

Subarea Plan 1 identifies three open space overlooks with educational signage and benches that will be maintained by the proposed Landscape Maintenance District.

MHPA Preserve Management

The proposed subarea plan also describes the management requirements for the various components of the open space system. Pursuant to the adopted MSCP, the preserve would be dedicated to the City of San Diego and the long-term management of the preserve would be the responsibility of the City. A Habitat Management Plan would be prepared for lands dedicated by the project applicant and incorporated into the subarea plan.

c) Subarea Plan 2

The open space system shown for Subarea Plan 2 is similar to Plan 1. However, with the more northerly alignment of SR-56, the interface with the MHPA open space along the southern portion of the site along McGonigle Canyon would be replaced by residential land uses rather than the freeway corridor forming the southern limit of development. In addition, the Del Mar Heights Road crossing of the north-south open space corridor linking McGonigle Canyon with Gonzales Canyon would be northerly of the location shown in Subarea Plan 1. This corridor would also be narrowed in the southwest corner of the project site. Overall, the encroachment into the MSCP preserve would be increased from approximately 149.9 acres to 212.0 acres under Plan 2. Gonzales Canyon corridor would remain unchanged from Plan 1. However, the primary neighborhood parkway corridor would be shifted to the west abutting the boundary of the public high school and would replace the north-south urban amenity proposed in the Framework Plan. The secondary neighborhood parkway would also abut the neighborhood park and elementary school in the northern portion of Pacific Highlands Ranch; however, it would not be connected to the ~~Town Center~~Village. This neighborhood parkway would provide a corridor to the MHPA open space areas of Gonzales Canyon to the east and La Zanja Canyon to the north. Three open space overlooks would be included in this plan as well.

The proposed development area for Subarea Plan 2 would be expanded into the defined MHPA open space boundary by approximately 212.0 acres. This total encroachment area is spread across the subarea and is similar to the encroachment described above for Plan 1. The major difference is in the southern portion of the site above McGonigle Canyon as described below.

- Both sides of the east-west urban amenity;
- Both sides of the north-south urban amenity;
- Gentle slopes above McGonigle Canyon at the eastern boundary;
- Gentle slopes above McGonigle Canyon in the south-central portion of the site;

- Gentle slopes above McGonigle Canyon at the western boundary;

- North-facing slopes above La Zanja Canyon;

- East of the approved Del Mar Highland Estates subdivision and south of the existing off-site Senterra development;

- Along the edges of the north-south wildlife corridor between Gonzales and McGonigle Canyons.

As with Plan 1, the natural open space system proposed under Plan 2 would also establish a system of wildlife corridors and habitat areas functionally equivalent with the MSCP. The on-site open space system would preserve the habitats and major wildlife corridors south of SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide a desired northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. Undercrossings are proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement. The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also continue to be a component of the natural open space system. Plan 2 also incorporates trails as shown in Figure 3-11 of the MEIR.

3) Residential Element

The residential component of Subarea III would consist of a variety of lot sizes and product types. The proposed densities would range from estate (0.25-1 dwelling units per acre [du/ac]) to the high density residential areas associated with the Village area of the ~~Town Center~~Village (34 du/ac). This element would also comply with the affordable housing requirements of the Framework Plan. Fulfillment of this objective may be satisfied by:

- A set aside of no less than 20 percent of the units for occupancy by, and at rates affordable to, families earning no more than 65 percent of median area income, adjusted for family size, or

- Dedicating developable land of equivalent value.

- Residential development of more than 10 dwelling units must satisfy the City's Affordable Housing requirements. This requirement should be satisfied through the provision of affordable housing on-site.

- Residential development of 10 or fewer housing units and residential development falling within the estate and very low density residential categories may, at the

discretion of the City, satisfy the affordable housing requirements by donating to the city an amount of money equivalent to the cost of achieving the required level of affordability, into an NCFUA Affordable Housing Trust Account administered by the San Diego Housing Commission

The residential design features of each of the subarea plans are described below.

a) Subarea Plan 1

Subarea Plan I would encourage a diverse mix of residential densities and product types. Approximately 4,974 new residential dwelling units would be allocated to Pacific Highlands Ranch under this land use plan. The residential units would be distributed throughout the subarea, and the proposed diversity of housing types would be intended to increase housing choice and affordability. A balanced distribution of housing types is proposed, with approximately 63.6 percent (3,161 units) of the units proposed as single-family and 36.4 percent (1,813 units) proposed as multi-family units.

The highest density of residential uses (34 du/ac) would occur within the Village ~~of the Town Center~~(maximum of 500 dwelling units at build-out). The areas adjacent to the ~~Town Center~~Village are shown as "core residential" (9-14 du/ac) on the land use plan and would be located adjacent to the ~~Town Center~~Village, north of SR-56 and south of Carmel Valley Road. These two densities would comprise the attached multi-family product types which total approximately 1,813 units (36.4 percent). The remainder of the residential units would consist of detached single-family units in a variety of lower densities: very low, low, and peripheral residential. The very low density (0.25-1 du/ac) residential areas would be primarily located in a non-contiguous portion of the subarea, along the western boundary of Del Mar Highlands Estates. Low density (2-5 du/ac) uses would be primarily sited north of Carmel Valley Road. "Peripheral residential" (5-9 du/ac) densities would be generally located along the SR-56 corridor and the area immediately north of the ~~Town Center~~Village. There would also be small areas of low density, and peripheral residential which accompany the existing Rancho Glens Estates very low density development south of the SR-56 alignment. Overall, the residential densities proposed would be less intense the further away from the ~~Town Center~~Village but each residential component would be integrated into the plan by trails, bikeways, urban amenity open space, and streets. The trail system would accommodate walking, biking, and jogging activities and would provide access to the ~~Town Center~~Village, civic areas, schools, and parks. The subarea plan would also include design principles which address open space, setbacks, garage siding, street patterns, and housing types and density.

b) Subarea Plan 2

Subarea Plan 2 would incrementally increase the allowed number of dwelling units up to 4,9740 new residential units, with approximately 65 percent (3,240) being single-family and 35 percent (1,7343) being multi-family. The more northerly alignment of SR-56 substantially would alter the residential layout under Plan 2 by narrowing the developable area between the freeway alignment and the Del Mar Heights Road/Carmel Valley Road corridor. The width between the Del Mar Heights Road/Carmel Valley Road corridor and the Gonzales Canyon urban amenity to the north would also be restricted. Because of these physical parameters, the resulting residential land use pattern in the northern portion of the subarea would generally consist of smaller and narrower residential development areas.

The residential uses south of the SR-56 alignment would also differ in the central portion of the subarea from Plan 1 because of the relocation of the freeway and the movement of the ~~Town Center~~Village. The residential densities and locations are generally similar to Plan 1 at the eastern and western portions of the site. However, the low density residential development shown at the southwestern boundary would be extended to the southern boundary under Plan 2 and access to the existing CUP would be from the west rather than from Camino Santa Fe on the east.

4) Town Center Element

The Pacific Highlands Ranch land use plan would include a Town Center, which would be generally located east of the intersection of Del Mar Heights Road and Carmel Valley Road. This land use designation would allow for a combination of commercial, office, high density residential, and public uses. The Town Center and its relationship to each of the land use plans are described below. The Town Center would be pedestrian-oriented providing retail, commercial, and employment uses for the Pacific Highlands Ranch. The 215-acre Town Center includes ~~approximately~~ 1,500 to 1,730 dwelling units, up to 300,000 square feet of retail and office space, a 50-acre senior high school, a 20-acre junior high school, a community park, a 65-acre ~~community green~~civic use area, and a 200,000-square-foot employment center. Within the Town Center is the Village. The Village consists of residential, commercial, and civic uses and is discussed below.

a) Subarea Plan 1

The Village component of the Town Center would consist of approximately 150,000 square feet of commercial retail uses, 150,000 square feet of commercial office uses, 500 high density residential units, ~~a town green (4 acres),~~ and a civic uses area (5 acres) on approximately 343 acres at the northeast quadrant of the SR-56/Camino Santa Fe interchange. The Village would be readily accessible via SR-56 and would be immediately east of the Del Mar Heights Road/Carmel Valley Road intersection and

would include a transit center ~~at the core of~~ in the civic use area. This area also would be served by the extensive system of pedestrian and bicycle paths. ~~A~~ The civic use area (i.e., pedestrian plaza and library) would also be proposed in the ~~Town Center~~Village, and core residential and a 613-acre community park are adjacent to the Village. Other allowable uses within the Village would include child care centers, community centers, and churches. Design principles for the Village are would be included in the subarea plan.

Employment Center

An approximately 200,000-square-foot employment center and a park-and-ride facility would be proposed on a 20-acre site south of the Village in the Town Center, north of the SR-56/Camino Santa Fe interchange. Access to the facilities located in the Village and surrounding land uses would be provided for by the incorporation of pedestrian connections and street systems in the design of the plan.

b) Subarea Plan 2

The acreages and square footages associated with each of the Town Center and Village area land uses would be similar to those described for Subarea Plan 1 above. However, with the northerly freeway location and shifting of the SR-56/Camino Santa Fe interchange to the east, the Town Center Area would be located on the south side of the freeway. Camino Santa Fe would border the ~~Town Center~~Village on the east rather than the west and would provide access to the various uses. The 20-acre community park would be moved to the east of Camino Santa Fe and the Village and adjacent to the senior high school and the SR-56 interchange with Carmel Valley Road.

Employment Center

The employment center under Subarea Plan 2 would not be adjacent to the Village and would be shifted to the northeast quadrant of the Camino Santa Fe/SR-56 interchange. The acreage would be 16 acres but the square footage would be similar to that described for Subarea Plan 1.

5) Community Facilities Element

Public facilities that would be provided within Pacific Highlands Ranch include schools, a library, safety services (fire), and parks. Overall, Pacific Highlands Ranch would require one community park, three elementary schools; two neighborhood parks, a junior high (and an optional junior high school site); a public and private high school; a public library; and a fire station. The private high school would include a community parish church that would replace St. William of York on Del Mar Trails Road. As described above, some of these public facilities would be sited within the Town Center Village area. Other community facilities would be located throughout the subarea.

6) Circulation Element

The major arterial circulation system within Pacific Highlands Ranch would consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and State Route 56. The alignment and configuration of each of the arterial facilities would generally be consistent with the adopted Framework Plan. However, the Framework Plan alignment for SR-56 is southerly from the two alignments addressed in this EIR. This other alignment, referred to as the central alignment, is addressed as an alternative to the proposed project in Chapter 6. With the movement of SR-56 into the development area, the precise alignments of the major on-site arterials have been refined in the subarea plans. As proposed in the subarea plans, both Carmel Valley Road and Del Mar Heights Road would be constructed as six-lane major arterials. Camino Santa Fe would extend southerly from SR-56 as a four-lane arterial. As proposed by the City, SR-56 would be a six-lane freeway with one interchange within Pacific Highlands Ranch. The circulation system for Pacific Highlands Ranch is based upon one interchange at Camino Santa Fe, and has been thoroughly reviewed and approved by the City Engineer. However, the development of an additional interchange along SR-56 is not precluded, but will result in necessary plan amendments to accommodate changes in the land use plan.

The precise alignment of the freeway alignments and other project area roadways are described for each land use plan below. It should be noted that another northerly alignment is included in the revised EIR for SR-56 (City of San Diego 1998). This alignment, described as the northern alignment, is similar to the "F" alignment associated with Subarea Plan 1. As such, any modifications to the proposed land use in plan 1 for Subarea III to accommodate this "northern" alignment would be within the range of alternatives addressed in the EIR, the two EIRs prepared for SR-56, and the NCFUA Framework Plan EIR.

a) Subarea Plan 1

Del Mar Heights Road would enter Pacific Highlands Ranch from the Carmel Valley community and terminate at its intersection with Carmel Valley Road. Del Mar Heights Road is designated in the General Plan and the Framework Plan for ultimate improvement in its current location as a six-lane major arterial with a 122~~9~~-foot right-of-way. Subarea Plan I would be consistent with this designation and alignment. In order to facilitate wildlife movement, a bridge on Del Mar Heights Road would be proposed over the north-south MSCP open space corridor just west of its intersection with Carmel Valley Road.

Carmel Valley Road would be extended northeasterly from its intersection with Del Mar Heights Road to the eastern boundary of the subarea. This alignment roughly parallels the SR-56 alignment shown in Subarea Plan 1. Carmel Valley Road would extend southerly to Camino Santa Fe at SR-56. Camino Santa Fe proceeds to the southern

boundary of the subarea. As with Del Mar Heights Road, a bridge would be provided on Camino Santa Fe south of SR-56 to allow east-west wildlife movement within the MSCP corridor along the southern boundary of the subarea.

SR-56 shown for Subarea Plan 1 represents "Alignment F" as presented in the draft EIR for the middle segment of SR-56 currently being prepared by the City. SR-56 crosses the entire NCFUA in an east-west direction, connecting Interstate 5 and Interstate 15. The easternmost and westernmost segments of SR-56 (2.3 and 1.8 miles long, respectively) are located outside of the NCFUA and already have been completed. Beginning at the western subarea boundary, this alignment primarily traverses disturbed agricultural land and proceeds northeasterly, north of the existing Rancho Glens Estates subdivision, and then easterly to the eastern project boundary. An interchanges is proposed at Camino Santa Fe.

Subarea Plan 1 would also provide a system of bicycle, pedestrian, and equestrian routes. The pedestrian and bicycle routes would connect the Town Center, public parks, and residential areas. The bikeways would also connect with the city-wide bikeway system. Equestrian trails would be provided within the MSCP open space which would provide linkages to the existing off-site trail systems to the north and south of Pacific Highlands Ranch.

b) Subarea Plan 2

The basic circulation components required in the Framework Plan would also be incorporated into Plan 2 with the more northerly alignment of SR-56 (Alignment "D"). The major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and State Route 56 freeway corridor. However, Alignment "D" would traverse Pacific Highlands Ranch in a diagonal manner and alter the backbone circulation system proposed under Plan 1.

Specifically, the transition from Del Mar Heights Road to Carmel Valley Road would be more linear from east to west and would roughly parallel SR-56 approximately 800 feet north of the freeway alignment. This east-west roadway through the subarea would be north of the Plan 1 location, as Del Mar Heights Road would trend northeasterly rather that southeasterly to the intersection with Carmel Valley Road. The intersection of Del Mar Heights Road and Carmel Valley Road would be approximately 2,400 feet east and approximately 3,000 feet north of the Subarea Plan 1 location. With this change the Camino Santa Fe/SR-56 interchange would also be north and east of the Plan 1 location.

7) Implementation and Phasing

The Pacific Highlands Ranch Plan would be implemented through the proposed phase shift, General Plan/Framework Plan Development Agreement, master rezoning, and the processing of future specific development proposals within subarea NCFUA. The Pacific Highlands Ranch Plan would describe these processes and provide detailed design principles for each of the proposed zone designations in the subarea. The proposed design principles are cited in this MEIR as part of the recommended mitigation measures.

8) Anticipated Future Projects

It is the intent of this MEIR to streamline future environmental review of subsequent development (tentative maps) by analyzing the potential impacts of the Pacific Highlands Ranch Plan at a level that will be sufficient for future projects where possible and to provide a framework for future impact analysis and mitigation consistent with this MEIR. Anticipated future projects would include tentative subdivision maps for the 1,665-acre Pardee Construction Company ownership, a conditional use permit for a private high school and parish church on the 54-acre Catholic ~~Diocese~~Church ownership, development plans for the designated elementary school and high school sites by the affected school districts, and tentative subdivision maps for the several other ownerships within the subarea.

At the time a future project is submitted, the City will prepare an Initial Study to determine whether the project may cause any significant impact that was not examined in this MEIR and whether the project was described as being within the scope of the Pacific Highlands Ranch Plan. If it is determined that the subsequent project will have no additional significant impacts and no new or additional mitigation measures or alternatives are required, then written findings can be made based on the Initial Study and no new environmental document will be required. If the Initial Study findings cannot be made, then either a Mitigated Negative Declaration or Focused EIR will be required as specified in CEQA Sections 21157.5 and 21158. Use of this MEIR is further limited in accordance with CEQA Section 21157.6.

This MEIR also analyzes the discretionary actions needed for the future actions (i.e., community plan and precise plan amendments, tentative map revisions, rezonings, planned development permits, etc.) associated with the Precise Plan for Carmel Valley Neighborhood 10. The environmental impacts associated with those revisions are addressed in the Biology, Traffic, and Landform Alteration sections of this MEIR. All other potential impacts are insignificant. The EIRs previously prepared for Carmel Valley Neighborhood 10 are incorporated herein by reference. Additional environmental action or consideration associated with revisions to Neighborhood 10 necessary to

implement the future discretionary actions described in the contemplated Development Agreement would not be necessary.

9) Discretionary Approvals Required

Discretionary approvals required by the City of San Diego for Subarea III would include a General Plan Amendment and NCFUA Framework Plan Amendment, adoption of the subarea plan, master rezoning, a North City Local Coastal Plan Amendment, Development Agreement, MSCP Subarea Plan Amendment and MHPA boundary adjustments and conferring Third Party Beneficiary status. In addition to City Council approval of the GPA and phase shift in conjunction with Subarea III Plan approval, the GPA and phase shift must be approved by a majority vote of the city's electorate in a general election. Each of the necessary approvals by the City Council and approvals/ permits that may be required from other agencies are discussed below:

General Plan Amendment/NCFUA Framework Plan Amendment: An amendment to the adopted General Plan/NCFUA Framework Plan is required to reflect the refinements to the subarea boundary, land uses (location, acreage, and residential densities), Environmental Tier size and configuration, and circulation pattern (e.g., State Route 56 alignment) proposed in the subarea plan.

Pacific Highlands Ranch Subarea Plan Approval: This action includes adoption of the land use plan proposed in the subarea plan and the approval of a Public Facilities Financing Plan (PFFP). The PFFP identifies the funding mechanisms and timing for the construction of the necessary public facilities within the subarea. These facilities may include arterial roadways, bridges, transit facilities, libraries, parks, police and fire stations, and drainage facilities.

Master Rezoning: The existing zoning within Subarea III consists almost entirely of agricultural zoning (A-1-10). The proposed master rezoning for the subarea is shown in Figures 3-17 (Plan 1) and 3-18 (Plan 2) of the MEIR. These zones would become effective with voter approval of a phase shift.

~~**MHPA Boundary Adjustment:** This action would amend the City's MHPA to include the sensitive habitats located in Neighborhood 8A while removing other less sensitive areas within Subarea III from the preserve system. In addition, Third Party Beneficiary Status would be conferred to allow development in sensitive resources.~~

~~**North City Local Coastal Program (LCP) Amendment:** The portion of Pacific Highlands Ranch within the Coastal Zone is under the jurisdiction of the California Coastal Commission. An amendment to the adopted LCP would be required to bring the LCP land use plan into conformance with the adopted subarea plan.~~

MHPA Boundary Adjustment: This action would amend the City's MHPA to include the sensitive habitats located in Neighborhood 8A and Subarea V (Deer Canyon and Lorenz Parcels) of the NCFUA while removing other less sensitive areas within Pacific Highlands Ranch (approximately 150 acres) and Carmel Valley Neighborhood 10 (approximately 8.41 acres) from the preserve system. The Third Party Beneficiary Status already granted for Neighborhood 10 with the City's approval of the MSCP Subarea Plan will remain and would include the 8.41-acre boundary adjustment. Concurrence by the wildlife agencies is required for the MHPA boundary adjustment. In addition, Third Party Beneficiary Status would be conferred to allow development in sensitive resources.

The boundary adjustment components include the conveyance of high-quality habitat in Carmel Valley Neighborhood 8A and Subarea V (Deer Canyon and Lorenz Parcel) by Pardee to the City, and an adjustment of the MHPA line to increase the size of the preserve within the Neighborhood 8A area. The MHPA would also be adjusted to delete largely disturbed habitat from the Pacific Highlands Ranch Subarea and Carmel Valley Neighborhood 10. The effect of these revisions to the MHPA would be to increase the preservation of very rare Tier I resources while allowing development on less sensitive disturbed and natural areas within Pacific Highlands Ranch and Neighborhood 10. Thus, the proposed MHPA boundary adjustment under the proposed subarea plan is considered superior in biological value to the adopted MHPA. No further action by the City or wildlife agencies is required.

At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 150 acres would be conveyed by Pardee, of which 55 acres of Tier I habitat would be added to the MHPA. An additional 20 acres within Parcel A may be added to the MHPA in the future should the City decide not to use this acreage for school/park uses. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term.

North City Local Coastal Program (LCP) Amendment: The portion of Pacific Highlands Ranch within the coastal zone is under the jurisdiction of the California Coastal Commission. An amendment to the adopted LCP would be required to bring the LCP land use plan into conformance with the adopted subarea plan.

Future Discretionary Actions: A Development Agreement is contemplated which includes the components described above for the MHPA boundary adjustment. In addition to the boundary adjustment components, the contemplated Development Agreement would include the following:

- In order to implement the above-described MHPA boundary adjustments, revisions to the Carmel Valley Neighborhood 10 Precise Plan would be necessary. These revi-

sions include an expansion of residential development (22 single-family units) on approximately 8.44 acres in to the MHPA (Precise Plan Unit 10) and an increase in the number of multi family units from 98 to 250 (Precise Plan Unit 10). The revisions to the Neighborhood 10 Precise Plan, tentative maps, and rezonings would be implemented subsequently by City Council action.

- Transfer of an additional 6 dwelling units in Subarea V from the Deer Canyon Parcel (approximately 60 acres) to the Lorenz Parcel (approximately 78 acres). This will allow construction of 46 dwelling units on the Lorenz Parcel.

- Transfer of title to the Deer Canyon Parcel to the United States Government or an agency thereof as may be directed by the City of San Diego.

- Establishment and approval by the City and wildlife agencies of a 20-acre mitigation land bank on Parcel A in Neighborhood 8A within Carmel Valley community planning area.

- Establishment and approval by the City and wildlife agencies of a 100-acre mitigation land bank in Subarea III of the NCFUA.

- Transfer of title to Parcel A and B within Neighborhood 8A of Carmel Valley to the City by Pardee, exclusive of those areas utilized for the 20-acre mitigation land bank.

- Pardee will convey to the City MHPA land within Subarea III exclusive of the area utilized for the mitigation land bank in Subarea III.

Other Discretionary Permits: Responsible and trustee agencies may include the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). Because the coastal California gnatcatcher is listed as a threatened species, authorization by the USFWS and CDFG is required prior to any "take" of coastal sage scrub. The City of San Diego has the authority to issue authorizations for "take" of the California gnatcatcher pursuant to federal Endangered Species Act. Development of the project site as proposed may require placement of fill within wetlands which would require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. In addition, alteration of streambeds by project grading may require a 1601/1603 agreement from the CDFG.

C. Environmental Setting

The topography of Pacific Highlands Ranch ranges from approximately 40 feet above mean sea level (MSL) in Gonzales Canyon at the northwestern corner to approximately 428 feet above MSL in the southeastern corner of the subarea. Mesas, gently sloping

hillsides, and canyons traverse the project site. The main topographic features on the project site include Gonzales Canyon in the northeast, McGonigle and Deer Canyons and Santa Monica Ridge in the southern portion of the site, and Del Mar Mesa along the southern site boundary. The project site is located within the watersheds of La Zanja Canyon to the north, Gonzales Canyon to the west, and McGonigle Canyon to the south. Runoff from the project site drains through these canyons either to Carmel Valley in the south or into the San Dieguito River to the north.

Existing land uses within Pacific Highlands Ranch include extensive agricultural acreage, several nurseries, horse ranches, scattered large-lot single-family homes associated with the agricultural/nursery operations, an approved borrow area, trailers used as nursery/agricultural worker housing, a pet housing facility, and a 29-unit single-family residential development known as Rancho Glens Estates along Caminito Mendiola. The nursery operations are mainly located along Black Mountain Road and grow flowers, palms, and other plants for landscaping purposes. The prime agricultural product in the project area is pole tomatoes. A north-south San Diego Gas & Electric (SDG&E) power line easement containing a high-power overhead electrical distribution line extends along the eastern boundary. Also, a main water line and two trunk sewer lines traverse the site. The remaining on-site acreage includes roads and open space, much of which is in a disturbed condition.

A variety of vegetation types occur within Pacific Highlands Ranch, including Diegan coastal sage scrub, southern maritime chaparral, grasslands, eucalyptus woodlands, coyote bush scrub, southern mixed chaparral, scrub oak chaparral, and riparian communities (southern sycamore riparian woodland, mule fat scrub, southern willow scrub, and southern riparian scrub). In addition, 15 sensitive plant species and 8 sensitive animal species have been observed on the property.

Access to Pacific Highlands Ranch is currently provided by Black Mountain Road, which traverses the site in an east/west direction between Del Mar Heights Road and Rancho Peñasquitos. Carmel Valley Road also provides access to the western portion of the site from the current terminus of SR-56. Regional access to the subarea is from I-5 via Del Mar Heights Road and SR-56.

Land uses surrounding Pacific Highlands Ranch consist primarily of open space and residential uses. Specifically, the Del Mar Country Club (golf course and estate residential uses), Fairbanks Ranch (estate residential), Senterra development (low density residential), The Lakes project (estate residential in the county of San Diego), and a nursery occur along the northern boundary. Vacant undeveloped lands within Torrey Highlands (Subarea IV) and Del Mar Mesa (Subarea V) exist adjacent to Pacific Highlands Ranch on the east and south, respectively. Shaw Ridge Road (dirt) parallels the southern boundary off-site within Subarea V. The surrounding land uses to the west

consist of low density residential development within the Carmel Valley community planning area both north and south of Carmel Valley.

D. Environmental Analysis

Table S-1 summarizes the results of the environmental analysis completed for the project.

E. Growth Inducement

The 2,652-acre Pacific Highlands Ranch project site is located in an area of approximately 12,000 acres identified as the North City Future Urbanizing area. All lands in the NCFUA are designated as agricultural (with A-1-10 zoning) on an interim basis to prevent premature urbanization and protect environmental and fiscal resources by precluding leapfrog development. A Framework Plan for the NCFUA has been adopted by the City as an amendment to the General Plan. This plan would permit the development of up to 14,780 residential units in the NCFUA, including 5,4260 units within Pacific Highlands Ranch. Implementation of the Framework Plan is dependent on a phase shift from "future urbanizing area" to "planned urbanizing area."

If such a "phase shift" is approved by the City Council, the amendment would be brought to the voters in a city-wide election for final action in accordance with Proposition A, the Managed Growth Initiative (R-264708, 12-16-85). A subarea plan for Pacific Highlands Ranch must also be prepared and adopted by the City prior to development at the densities permitted in the Framework Plan.

The Growth Inducement section of the Final EIR for the NCFUA Framework Plan (City of San Diego 1992b) concluded that implementation of the Framework Plan would have a significant growth-inducing impact. While this is also true for either of the proposed Pacific Highlands Ranch plans, the NCFUA Framework Plan addressed buildout of Pacific Highlands Ranch with up to 5,4260 dwelling units and 400,000 square feet of commercial and office space. Both proposed subarea plans (Plan 1 and Plan 2) would develop less than 5,000 dwelling units and 400,000 square feet of commercial and office space and are, therefore, consistent with the Framework Plan.

Nevertheless, the proposed Pacific Highlands Ranch plans would still remove obstacles to growth by providing infrastructure facilities in previously undisturbed areas, as described in the Framework Plan EIR. In conclusion, either of the proposed subarea plans would have a growth-inducing impact on the area.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
LAND USE			
1. Would the proposed project implement the goals, objectives, and recommendations of the City of San Diego Progress Guide and General Plan and the environmental goals of the Framework Plan for the North City Future Urbanizing Area? Would the proposed project implement existing City plan and policies?	Both proposed plans are generally consistent with the intent of the General Plan, environmental goals of the adopted NCFUA Framework Plan, Council Policy 600-40, and the North City LCP. The lack of compliance with the preservation of agricultural lands and the unmitigated direct traffic impacts identified in this MEIR represent a significant direct ~~and cumulative~~ land use impact.	Only the No Project alternative would avoid the cumulative land use impacts associated with the loss of agricultural lands.	Significant, not mitigated.
2. Would the Pacific Highlands Ranch Plan result in a conflict of the purpose and intent of the Resource Protection Ordinance?	Both subarea plans have been prepared consistent with the requirements of City Council Policy 600-40. However, both plans would not be consistent with the encroachment provision of RPO as they apply to steep slopes, wetlands, and significant prehistoric sites. As such, this would represent a direct ~~and cumulative~~ significant land use impact.	Both subarea plans have been designed to minimize impacts to RPO-sensitive resources; however, strict compliance with the development regulations of the ordinance would require a project redesign. The plans' inconsistency with the RPO encroachment provisions can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative.	Significant, not mitigated.
3. Would the project result in a conflict with the purpose and intent of any current planning process or adopted environmental plans or policies for the area?	Both Plan 1 and 2 for Pacific Highlands Ranch would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon. Therefore, they are considered consistent with the goals and objectives of the FPA.	No mitigation is required.	Not significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
LAND USE (cont.)			
4. Would the project be compatible with existing and planned uses in the project vicinity. Would the uses in the proposed subarea result in any internal land use conflicts?	The interface of the proposed on-site uses under both land use plans for Pacific Highlands Ranch would not represent a significant land use compatibility impact with existing adjacent uses.	No mitigation is required for the interface of the proposed Pacific Highlands Ranch plans with existing off-site land uses and planned land uses surrounding Subarea III.	Not significant.
	The identified potential internal land use compatibility impacts in conjunction with the SR-56 alignment are considered potentially significant. The significance of this impact is also described in the Revised Draft EIR for the Middle Segment of SR-56. Also, the proposed extension of Carmel Valley Road could result in significant land use incompatibilities with the proposed Pacific Highlands Ranch residential developments along these roadways.	Mitigation for the potential internal land use compatibility impacts associated with proposed land uses and the SR-56 freeway would consist of the requirement for landscaping and noise attenuation measures at the time tentative maps are processed.	Less than significant.
5. How is the project consistent with the City of San Diego's Multiple Species Conservation Program (MSCP) Subarea Plan?	The Pacific Highlands Ranch Plan would provide for a preserve area that is functionally equivalent with the MHPA proposed in the adopted MSCP. No significant adverse effects to MSCP implementation would result through implementation of either Subarea Plan.	No mitigation is required.	Not significant

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
TRAFFIC			
1. What direct and/or cumulative traffic impacts would the project have on the existing and planned community and regional circulation networks?	Table 4B-14 of the MEIR shows the on- and off-site roadway segments and intersections adversely affected by the proposed project. In those cases where the project traffic does not exceed 2 percent of the total traffic, direct traffic impacts are considered less than significant. In those cases where the project traffic exceeds 2 percent of the total traffic, direct traffic impacts are considered significant. When the roadway segment or intersection is currently failing, a significant direct and cumulative traffic impact would occur. Also, the project would add to area freeway waiting time where the wait already exceeds 15 minutes. These impacts are shown on Table 4B-14 and are considered significant; however, mitigation is beyond the scope of the applicant or the City.	Table 4B-14 of the MEIR includes all of the area's transportation improvements necessary to reduce project impacts (direct and cumulative) to the extent feasible; however, as shown in the fourth column of the table, not all impacts are reduced to below a significant level. In that event, only adoption of the No Project alternative would avoid all of the project's significant direct and cumulative traffic impacts.	Significant, direct and cumulative impacts.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
BIOLOGICAL RESOURCES			
1. Would the proposed project, including compliance with the City's Brush Management Program, result in impacts to important habitat or to sensitive plant and animal species.	The direct, indirect, and cumulative impacts to sensitive biological resources are considered significant. The significant impacts include loss of MSCP Tier I and Tier II habitats, direct and cumulative loss of riparian scrub wetland habitats and impacts to sensitive plant and animal species identified in Chapter 4.C, Biology of this MEIR.	The significant direct and indirect impacts to upland biological resources would be mitigated to below a level of significance through conformance and implementation of the MSCP. The MSCP impacts and mitigation requirements are shown in Tables 4C-4 and 4C-5 of the MEIR. Table 4C-4 shows the mitigation requirements for Plan 1 and Table 4C-5 shows the mitigation requirements for Plan 2. These tables separate the mitigation requirements for the Pardee ownership and the non Pardee ownerships. The identified mitigation ratios are per the adopted MSCP based on the vegetation type (Tier Designation) being impacted. As these tables indicate, there is adequate acreage on-site to mitigate for Pardee's direct impacts. Other mitigation requirements which would be implemented at the time future tentative maps to deal with direct and indirect impacts are outlined in Chapter 4.C, Biology, Issue 1 of this MEIR.	Direct impacts are significant, but mitigated. Cumulative impacts to grasslands and wetlands will remain significant and unmitigated
2. Would implementation of the Pacific Highlands Ranch Plan result in interference with the movement of any resident or migratory wildlife species?	Both Subarea Plans 1 and 2 accommodate the wildlife corridors identified in the MSCP (i.e., McGonigle Canyon, Gonzales Canyon, and the north-south linkage between the two). Impacts on wildlife movement would not be significant.	No mitigation is required other than the City's management and monitoring responsibilities as described in the MSCP.	Not significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
BIOLOGICAL RESOURCES (cont.)			
3. Would the project affect the long-term conservation of biological resources?	Both subarea plans would provide for a regional open space system that is functionally equivalent with the MHPA proposed in the adopted MSCP. In addition, Pardee Homes will dedicate natural land located within Carmel Valley Neighborhoods 8A and 8C as discussed in Chapter 4.C, Biology. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. No significant adverse effects to biological diversity would result through implementation of either Subarea Plan.	No mitigation is necessary.	Not significant

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
HYDROLOGY/WATER QUALITY			
1. What modification to the natural drainage system would be required for implementation of the Pacific Highlands Ranch Plan? Would the project result in changes in the rate and amount of runoff?	Construction activities in Pacific Highlands Ranch could result in significant erosion, siltation, and water quality impacts. The increase in runoff volume and velocity due to the introduction of streets, roads, and other hardscape surfaces could result in significant adverse erosion, water quality, and flooding impacts to existing natural drainage courses and the Carmel Valley storm drain system. However, these impacts are mitigable to below a level of significance by incorporating the City's BMPs and standard engineering practices.	Incorporation of the measures outlined in the Hydrology section of the Final MEIR (e.g., Storm Water Pollution Prevention Program, energy-dissipating structures, desilting basins, and National Pollutant Discharge Elimination System (NPDES) requirements) shall be specified in the grading plan and conditions of approval for future VTMs.	Less than significant.
2. Would the project result in alterations to the course or flow of floodwaters?	Impacts to the course and flow of floodwaters are mitigable to a level of less than significant through the incorporation of the mitigation measures and BMPs identified in the Hydrology section of the Final MEIR.	Impacts to floodwaters would be mitigated to a level of less than significant by incorporating the mitigation measures and BMPs identified for Issue 1 above. All flood control measures would be reviewed and approved by the City's Transportation and Drainage Design Division of the Public Works Business Center prior to construction.	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
HYDROLOGY/WATER QUALITY (cont.)			
3. What effect would implementation of the plan have on water quality of the San Dieguito River and Los Peñasquitos Creek, and Carmel Valley River Enhancement Project drainage basins?	Impacts to floodwaters would be mitigated to a level of less than significant by incorporating the mitigation measures and BMP measures identified in Hydrology, Issue 1, of this MEIR. All flood control measures would be reviewed and approved by the City's Transportation and Drainage Design Division of the Public Works Business Center prior to construction. The proposed project's effects would be less adverse overall than those currently resulting from commercial agricultural activities on-site.	Direct impacts to water quality would be mitigated to a level of less than significant by incorporating the mitigation measures identified for Hydrology, Issue 1, of this MEIR. Incorporation of the mitigation measures identified in Hydrology, Issue 1, of this MEIR would not mitigate fully the associated cumulative effects to water quality in the subarea. Only the No Project alternative would avoid potential cumulative significant impacts.	Less than significant. Significant, unmitigated cumulative impacts.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

	Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
LANDFORM ALTERATION/VISUAL QUALITY				
1	Would implementation of the plan result in substantial alteration of the existing character of the area?	Uses under either proposed subarea plan would substantially alter the existing aesthetic character of the proposed site. This change represents a significant direct and cumulative impact from on- and off-site locations. The development of the project site would incrementally contribute to the change in aesthetic character of the subregion in conjunction with the existing and planned development in Carmel Valley and Subareas IV and V.	Implementation of the landscaping concepts incorporated in future tentative maps, and the preservation of MSCP and urban amenity open space would reduce the identified aesthetic impacts; however, not to a level of less than significant. Avoidance of the associated impacts would be accomplished by the No Project alternative	Significant, unmitigated direct and cumulative impact.
2	Would implementation of the plan result in a substantial change in topography or ground surface relief features?	Both grading concepts associated with the proposed land use scenarios would require substantial alteration of the topography to develop and access the site. Alterations to the existing topography, the filling of drainages, and the grading of broad mesas are considered significant direct and cumulative landform alteration impacts.	Prior to the issuing of a grading permit, the Development Service Department shall review the grading plans for consistency with the Subarea Plan guidelines. Mitigation measures such as slope rounding and blending techniques to achieve a more natural looking appearance would reduce the associated impacts, but not below a level of significance. The No Project alternative would avoid the landform alteration impacts.	Significant, unmitigated direct and cumulative impacts.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
LANDFORM ALTERATION/VISUAL QUALITY (cont.)			
3. Would implementation of the plan result in the loss, covering, or modification of any unique geologic or physical features, such as canyons, bluffs, or hillside with a slope gradient in excess of 25 percent?	Based on the steep slope encroachment analysis prepared for both subarea plans, significant impacts are anticipated on canyons, bluffs, or hillsides in Pacific Highlands Ranch.	Although both subarea plans have been designed to minimize impacts to steep slopes, strict compliance with the encroachment thresholds in the development regulations of RPO would require a project redesign. Both plans' inconsistency with the RPO encroachment provisions can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.	Significant unmitigated.
4. Would implementation of the plan result in the loss of any distinctive landmark tree(s) or a stand of mature trees?	No significant impacts are anticipated.	No significant impacts are anticipated, therefore, no mitigation is required.	Not significant.
CULTURAL RESOURCES			
1. Would implementation of the Subarea Plan adversely affect archaeological or historical resources?	Four sites in the project area have been found to be potentially eligible for nomination to the National Register of Historic Places, 24 sites have been found not significant, 6 sites are in open space areas and	Mitigation of the significant cultural resource sites will require implementation of a sampling program of sufficient size to collect a representative sample of the information available at these sites. This program should include a phased sampling program based on a comprehensive treatment plan prepared to the satisfaction of the	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
CULTURAL RESOURCES (cont.)			
	should be indexed prior to recording Tentative Maps for future projects, 2 sites are in open space and may be potentially significant and require additional evaluation, and 1 site is located outside of the project boundaries and will require some evaluation when a project is proposed for this property. The resulting loss of all of the sites on this project is considered a significant cumulative loss of cultural resource information. The destruction of a number of these sites prior to indexing or testing of any kind constitutes a significant impact as important information, which may have been present in these sites has been lost without record.	City of San Diego. The extent of testing and excavation will be based upon the information collected and analyzed during each phase of investigation. Data recovery shall be completed to the satisfaction of the City of San Diego. The cumulative loss of cultural resources would be significant and unmitigated.	Cumulative impacts are significant, unmitigated
AIR QUALITY			
1. Would implementation of the Pacific Highlands Ranch Plan affect the ability of the County to meet federal clean air standards according to the Regional Air Quality Strategy?	a) Construction Emissions. Dust control during grading operations would be regulated in accordance with the rules of the San Diego APCD and the regulations of the City of San	No significant direct air quality impacts are anticipated with approval of the proposed project. Therefore, no mitigation is required.	Not significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue		Results of Impact Analysis	Mitigation	Impact Level After Mitigation
AIR QUALITY (cont.)				
		Diego Land Development Ordinance. Additionally, construction would be phased and construction of each phase would be a one-time, short-term activity. Air quality impacts due to construction of the proposed project would not be significant.		
	b)	Developed Condition Emissions. The proposed project would be consistent with the RAQS and would not create direct traffic impacts to the surrounding street system provided that the recommended road improvements are constructed. Therefore, direct air quality impacts would not occur if the proposed project were implemented.	No significant direct air quality impacts are anticipated with approval of the proposed project. Therefore, no mitigation is required.	Not significant.
		The proposed project would result in significant cumulative air quality impacts under the City's significance thresholds as discussed in Chapter 6 of this EIR.	Cumulative air quality impacts can not be mitigated at the project level. Only the No Project Alternative would avoid the proposed project's contribution to cumulative impacts.	Significant, unmitigated.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
AIR QUALITY (cont.)			
	c) Forecasted Traffic Conditions. Development of the proposed project would not directly result in roadway or intersection levels of service below D. Therefore, no significant direct air quality impacts are anticipated. Cumulative air quality impacts would be significant.	No significant direct air quality impacts would be anticipated with approval of the proposed project. No mitigation is available for cumulative air quality impacts at the project level. The project's contribution to cumulative air quality impacts is discussed in Chapter 6 of this EIR. The No Project alternative would avoid potential significant air quality impacts..	Direct impacts are not significant. Cumulative impacts would be significant, unmitigated.
GEOLOGY/SOILS/EROSION			
1. Are there geologic soils or conditions in the subarea which would present a constraint to development?	No significant soil or geologic conditions were observed or are known to exist which would preclude development of the subarea. However, potentially significant geologic conditions exist which require mitigation, including ancient landslides, expansive soils, unstable cut slopes, alluvial soils, poorly consolidated soils, and ground shaking due to an earthquake.	For each specific development application in Pacific Highlands Ranch, the City will require the applicant to submit a detailed geotechnical study by a qualified geotechnical firm. The conclusions and implementation of the recommendations provided in these reports would mitigate the potentially significant effects of soil and geologic conditions for future developments in Pacific Highlands Ranch to below a level of significance. The types of mitigation requirements which the feasibility studies are likely to contain are summarized in Chapter 4.H, Geology, of this MEIR.	Less than significant.
2. Would development of the site increase the potential for erosion?	Future grading activities for the implementation of specific development projects in Pacific Highlands Ranch would result in a potentially significant increase in soil erosion.	Prior to the approval of a grading permit, each applicant for a specific development project in Pacific Highlands Ranch shall prepare a grading/construction management plan. The City's Development Services Business Center staff must approve the grading/construction management plans before a grading permit is issued. The mitigation	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
GEOLOGY/SOILS/EROSION (cont.)			
		measures listed in the Geology/Soils/Erosion Issue 2. and those listed in the Hydrology/Water Quality section of this MEIR will be incorporated in the plans.	
NATURAL RESOURCES			
1. Would implementation of the Pacific Highlands Ranch Plan result in the conversion of agricultural land to nonagricultural uses or impairment of existing agricultural productivity?	As described in the NCFUA Framework Plan EIR, the direct impacts to prime agricultural resources on the project site from open space preservation and development are considered significant. The incremental loss of land being used for agriculture is also considered a significant cumulative impact and is identified as such in Chapter 6 of this MEIR.	Only implementation of the No Project alternative would reduce the identified agricultural resources impact to below a level of significance.	Significant, not mitigated
2. Would implementation of the project result in the prevention of future extraction of sand and gravel and/or mineral resources?	The loss of the potential for recovery of mineral resources from mineral resource zones classified by the state as significant (MRZ-2) has the potential to be a significant, long-term impact. However, there is no history of mining activity in	No mitigation of direct impacts would be required. Only the No Project Alternative would avoid potential cumulative significant natural resource impacts.	Direct impacts are not significant. Cumulative impacts are significant, but mitigated.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
NATURAL RESOURCES (cont.)			
	Pacific Highlands Ranch and no known sensitive mineral resources in Pacific Highlands Ranch would be excavated and removed or covered with development as part of plan implementation. Rather, they would be retained in perpetuity as open space areas. Therefore, no potentially significant direct impacts are anticipated. However, the potential exists for significant cumulative impacts.		
PALEONTOLOGICAL RESOURCES			
I. To what extent would implementation of the Pacific Highlands Ranch Plan result in the loss of paleontological resources?	The potential for significant fossils to occur in the formations of the subarea plan is moderate to high in all areas planned for development of the Pacific Highlands Ranch Plan; therefore, the grading necessary to implement the subarea plan could result in significant impacts to paleontological resources.	The Pacific Highlands Ranch Plan would require that all future tentative maps and VTMs approved include a condition for the implementation of a monitoring and salvage program for the recovery of paleontological resources during development. The program shall follow the mitigation measures identified in the Paleontological Resources section of this MEIR. The identified mitigation measures would reduce the potential impacts to below a level of significance. Prior to subarea plan approval, the Development Services Business Center shall verify that the above mitigation measures are incorporated in appropriate sections of the subarea plan. These measures shall be conditions of subsequent tentative maps and VTMs and development proposals.	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
NOISE			
1. Would existing or future noise levels resulting from the proposed project adversely impact sensitive noise receptors in and around the project area?	Noise levels are anticipated to exceed applicable standards for all residential uses immediately adjacent to SR-56 and the major roadways, as well as to proposed school and park uses. Noise levels could exceed 70 CNEL for professional and office building land uses depending on their placement relative to the roadways. Noise levels for commercial retail land uses are not expected to be exceeded unless they are located immediately adjacent to SR-56. Where noise levels exceed applicable exterior standards, noise impacts would be significant.	Mitigation of noise levels could be accomplished through the construction of noise barriers. However, due to the limited grading detail available at this stage of planning, it is not possible to determine specific barrier heights and locations. At the time that detailed grading plans are available for the future subdivisions within Subarea III, detailed acoustical analyses shall be performed to determine the exact barrier heights and locations where required. If exterior noise levels within residential areas are found to be above 60 CNEL after mitigation, then detailed interior noise analyses will be required as well.	Less than significant.
PUBLIC FACILITIES AND SERVICES			
1. How would implementation of the Subarea Plan affect public services, particularly schools, parks, libraries, and police and fire protection?	Currently, all the schools expected to serve the project are operating above capacity. Implementation of either of the proposed plans for the subarea would create an increased demand for educational facilities.	The development of the proposed on-site elementary, junior high and high schools would accomplish mitigation of the project's direct impact to schools from the subarea plan. School facilities financing and mitigation agreements between the affected school districts and the project applicant would be required at the time the Subarea Plan is	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
PUBLIC FACILITIES AND SERVICES (cont.)			
	This is considered a significant direct and cumulative impact.	approved by the City Council to ensure that the impacts on school facilities are mitigated to a level less than significant. In addition, prior to granting a ministerial or discretionary entitlements for a parcel, such parcel shall be subject to the terms of a mitigation agreement entered into by the landowner and the applicable School Districts or included in a community facilities district established by the applicable School Districts and authorized to fund the acquisition of school sites and construction of schools. ~~Mitigation of the project's direct impacts to schools expected to serve the subarea would be accomplished by the development of the proposed on-site schools. At the time tentative maps are processed, agreements between the affected school districts, the applicant, and the City would be required to ensure that impacts on educational services are mitigated to below a level of significance.~~	
	Development of the subarea plan would incrementally increase the demand for parks, recreation, library, police, and fire services; however, both subarea plans	No mitigation for parks, library, and police services is required as facilities are provided in the proposed subarea plans or in surrounding areas.	Not significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
PUBLIC FACILITIES AND SERVICES (cont.)			
	provide sites for the development of library, park, and fire facilities. The resultant increased demand upon these services would not constitute a significant impact on parks, library, and police services. Significant impacts would occur to fire services.	Until the new fire station is operating, developers shall demonstrate to the satisfaction of the City Fire Department that a response time of six minutes or less from Fire Station 24 to all portions of new developments can be achieved. For those areas of such new developments where a six-minute response time cannot be provided, individual sprinkler systems or other construction or site design safeguards, approved by the Fire Department, shall be required prior to the issuance of building permits.	
2. Would implementation of the plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater? Would the proposed plan result in the generation of excessive amounts of solid waste?	Development of the proposed plan would result in potentially significant impacts to existing water and sewer facilities. However, the existing regional infrastructure would be sufficient to provide the water and sewage effluent needs of the proposed subarea.	Future developers shall be required to provide appropriate water studies consistent with the findings and conclusions of the Miramar 712/North City 610 Water Study. Each developer shall be responsible for installing all those facilities identified in the accepted studies which are necessary to serve their developments. Prior to any new development within the subarea, developers shall be required to provide sewer studies showing the proposed sewer system for the subarea. All public water facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
PUBLIC FACILITIES AND SERVICES (cont.)			
	The generation of solid waste during the construction of the project and the ongoing waste generated by the residential, commercial, and industrial uses of the development would result in an incremental increase for solid waste services.	Incorporation of the measures outlined in Chapter 4.L, Public Services Issue 3 of this MEIR will reduce the potential impacts the City's waste management services to below a level of significance.	Less than significant.
WATER CONSERVATION			
1. Would implementation of the plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater?	It is not anticipated that excessive amounts of water consumption or wastewater generation would result from the implementation of the proposed plan. The City of San Diego Water Utilities Department Planning and Design Guide and Landscape Technical Manual guidelines would be incorporated into the proposed plans. Nevertheless, the project would contribute to a regional cumulative impact associated with water supplies.	No mitigation is required for direct impacts to water supplies but mitigation measures shall be incorporated into project design guidelines to address cumulative water usage concerns: a. Limit grading in areas where no construction is proposed; thereby reducing the need for planting and irrigation of graded areas. b. Provide lifts of low-clay content soil in landscaped areas to improve infiltration. c. Reduce runoff potential from landscaped areas by using berming, raised planters, and drip irrigation systems.	

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
WATER CONSERVATION (cont.)			
		d. Install soil moisture override systems in all common irrigation areas to avoid sprinkling when the ground is already saturated	Not significant.
		e. Identify in the plant materials list in the project design guidelines whether or not plants are native or naturalize easily and incorporate a list of local California sources for native plants.	
		f. Incorporate low-flush toilets, low-flow faucets, and timers on sprinklers (including nighttime watering) into project design.	
		g. Provide information regarding water conservation measures to new residents at the time of lot purchase.	
PUBLIC SAFETY			
1. Would implementation of the Pacific Highlands Ranch Plan expose people to potential health hazards?	Studies of the potential for adverse public health effects of electromagnetic fields are inconclusive. A statement or conclusion of impacts would be speculative. In accordance with CEQA Section 15145, the known information about electromagnetic fields is summarized and no conclusion of significance is reached.	No mitigation is required.	Not significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
PUBLIC SAFETY (cont.)			
	Future developments shall provide a hazardous soils assessment to be conducted by a qualified professional to determine if hazardous soils are present on-site. If hazardous soils are found, a remediation plan shall be prepared and approved by the County Department of Environmental Health for the project. The recommendations of the remediation plan shall be implemented as a condition of project approval.	No mitigation is required.	Not significant.
	Because the proposed project contains on-site detention basins to serve the subarea, the potential for public health and safety impacts to future residents within the project site are considered potentially significant.	Mitigation measures for potential increased mosquito populations which will decrease potentially significant impacts to below a level of significance are identified in Chapter 4.H, Public Safety, of this MEIR. Prior to any grading activities, the applicant shall provide a letter from the County Environmental Health Department Vector Surveillance and Control Division (VSCD) to the environmental review manager of Development Review Division verifying that a vector control program has been designed.	Less than significant.

TABLE S-1
SUMMARY OF ENVIRONMENTAL ANALYSIS RESULTS
(continued)

Environmental Issue	Results of Impact Analysis	Mitigation	Impact Level After Mitigation
POPULATION			
1. Would the proposed implementation of either Plan 1 or 2 for Pacific Highlands Ranch alter the planned location, distribution, density, or growth rate of the population?	The Pacific Highlands Ranch Plan and the proposed phase shift from Future Urbanizing to Planned Urbanizing (if approved) would remove a barrier to population growth in the subarea and the rest of the NCFUA. The Pacific Highlands Ranch Plan includes an effective comprehensive development phasing program which would preclude any significant indirect impacts to public services and facilities or traffic congestion. The proposed project is part of a comprehensive subarea planning program designed to anticipate and resolve indirect impacts caused by increased population. In addition, the Pacific Highlands Ranch Plan includes a strong phasing program to stage development to meet the demand for transportation and public services and thus avoid indirect impacts.	Since the identified population impacts are not considered significant, no mitigation measures are required.	Not significant.

F. Project Alternatives

Table S-2 compares the impacts of the proposed project with all the project alternatives.

1) No Project Alternative

The No Project alternative typically implies no development of the project site. This approach would result in the retention of the property in its present condition. As a result, the impacts associated with the proposed Plans 1 and 2 for Pacific Highlands Ranch relating to biological resources, landform alteration/visual quality, agricultural resources, cultural resources, public facilities and services, air quality, noise, and cumulative contribution to traffic congestion would be eliminated.

This alternative would not achieve the goals and objectives of the project and the adopted Framework Plan. The Framework Plan objectives of providing housing, facilities benefit assessment fees, and roads would not be achieved. In addition, the permanent contributions provided by the proposed subarea plans to the MSCP preserve would be eliminated.

2) Alternate Site Design - Plan 1

A conceptual alternative site design for Pacific Highlands Ranch Plan 1 (see Figure 8-1 of the MEIR) has been developed by the City of San Diego which, with the exception of the shown alignment of SR-56, more closely adheres to the land use concept described in the adopted NCFUA Framework Plan (see Figure 4A-1 of the MEIR). Table 8-1 of the MEIR provides a comparison of this alternate design plan's land uses with the one proposed by Plan 1. Like the proposed project, this alternative design for Plan 1 includes a similar number of dwelling units, a mixed use core area consisting of commercial uses, community park, various residential densities, and a civic area; a high school, a fire station; and the associated public facilities and transportation network. The site design also includes a junior high school, but does not include an elementary school or neighborhood park. In addition, the alternative design includes moderately low residential densities which are not included in the proposed Plan 1.

Other differences affect the high school which would be shifted away from the MUC to a location further east and north of Carmel Valley Road. The community park and very low-density residential would also be in different locations, and an employment center would not be a component of the alternate plan. Residential development would also be extended south of SR-56 near the western boundary which is shown as MHPA open space in the proposed Plan 1. However, as with the proposed Plan 1, the limits of development and grading would cover approximately 50 percent of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 of the MEIR

TABLE S-2
ALTERNATIVE PROJECTS COMPARISON

Issue	Proposed Plan 1	Proposed Plan 2	No Project	Alternative Site Design - Plan 1	Alternative Site Design - Plan 2	Non-Phase Shift - Plan 1 Alternative	Non-Phase Shift - Plan 2 Alternative	Non-Phase Shift - Plan 3 Alternative	SR-56 Central Alignment Alternative	Resource Protection Ordinance Alternative
Land Use										
General Plan Consistency	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant
Framework Plan Consistency	Significant not mitigated	Significant not mitigated	Significant, not mitigated	Significant, not mitigated	Significant not mitigated	Significant not mitigated	Significant not mitigated	Significant not mitigated	Significant not mitigated	Significant not mitigated
Consistency with RPO	Significant not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant not mitigated	Less than significant	Less than significant	Less than significant	Significant, not mitigated	Less than significant
Compatibility w/SDRRP	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant
Compatibility w/Adjacent Uses	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant
Consistency with MSCP	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Less than significant
Traffic Circulation	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Less than significant	Less than significant Significant cumulative	Less than significant	Significant , not mitigated	Significant, not mitigated
	Significant cumulative	Significant cumulative	Less than significant	Significant cumulative	Significant cumulative	Significant cumulative		Significant cumulative	Significant cumulative	Significant cumulative
Biology										
Habitat/Species Impacts	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated
Wildlife Corridor Impacts	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	significant, mitigated	Less than significant
Impacts to long-term conservation of biological resources	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Less than significant
Hydrology/Water Quality										
Drainage	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated
Downstream Water Quality	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated
Landform Alteration/Visual Quality										
Landform Alteration	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated
Visual Quality	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated
Impacts to steep slopes	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, mitigated
Impacts to landmark trees	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant	Less than significant
Cultural Resources	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Less than significant
Air Quality	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Less than significant
Geology/Soils/Erosion										
Geologic Constraints	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated
Soil Erosion	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated	Significant, mitigated
Natural Resources										
Agricultural land	Significant, not mitigated	Significant, not mitigated	Less than significant	Significant, not mitigated	Significant, not mitigated	Less than significant	Less than significant	Less than significant	Less than mitigated	Significant, mitigated
Sand/gravel/mineral resources	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Paleontology	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Noise	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Public Facilities and Services	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Water Conservation	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Public Safety	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated
Population	Significant, mitigated	Significant, mitigated	Less than significant	Significant, mitigated	Significant, mitigated	Less than significant	Less than significant	Less than significant	Less than significant	Significant, mitigated

details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

This alternative would reduce impacts to biological resources. The open space design under this alternative, while similar to Plan 1, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP for Subarea III. As noted throughout this EIR, the MHPA as defined by the MSCP Subarea Plan has superseded the Framework Plan Environmental Tier. Thus, the additional open space shown in the alternate plan associated with the northern linkage to La Zanja Canyon in the northwest corner of Pacific Highlands Ranch and the retention of eastern on-site portions of Gonzales Canyon differ from the proposed subarea plan. This additional open space would accordingly reduce the impacts to native habitats associated with the proposed Plan 1.

From a circulation standpoint, the major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor ("F" Alignment). The circulation pattern would be similar to the proposed Plan 1, but Camino Santa Fe south of SR-56 would follow a more north-south route through the MHPA. Likewise, Carmel Valley Road, just north of SR-56, would connect to Del Mar Heights Road in a north-south manner. The traffic generation under this alternative would be similar to the proposed Plan 1, and traffic circulation impacts would not substantially differ from the proposed project. This alternative would not create a significant direct traffic impact on the area's circulation system.

3) Alternate Site Design - Plan 2

A conceptual alternative site design for Pacific Highlands Ranch Plan 2 (see Figure 8-2 of the MEIR) has also been developed by the City of San Diego reflecting SR-56 Alignment "D." Like the proposed project, this alternative design for Plan 2 includes a similar number of dwelling units, a mixed use core area consisting of commercial uses, community park, high-density residential, and a civic area; an employment center; a high school, a fire station; and the associated public facilities and transportation network. The alternate site design also includes a junior high school, but does not include an elementary school or neighborhood park. In addition, the alternative design includes moderately low residential densities which are not included it the proposed Plan 2.

Other differences between the proposed Plan 2 and the alternate site design prepared by the City include the shifting of the high school away from the MUC to a location further east and north of Carmel Valley Road. The MUC would be bisected by Camino Santa Fe under this design, and the acreage shown for employment center and specialized commercial uses would be substantially increased along the north side of the SR-56 corridor. The limits of development and grading would cover approximately 50 percent

of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 of the MEIR details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

The differences in environmental impacts between these plans are minimal and the significance of project-related impacts would not be substantially affected. However, the open space design under this alternative, while similar to Plan 2, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP for Subarea III. As noted throughout this EIR, the MHPA as defined by the MSCP Subarea Plan has superseded the Framework Plan Environmental Tier. Thus, the additional open space shown in the alternative plan associated with the northern linkage to La Zanja Canyon in the northwest corner of Pacific Highlands Ranch and the retention of eastern on-site portions of Gonzales Canyon differ from the proposed subarea plan. This additional open space would accordingly reduce the impacts to native habitats associated with the proposed Plan 1. This alternative would reduce impacts to biological resources.

From a circulation standpoint, the major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor ("D" Alignment). However, the alignment of these roadways are less curvilinear north of SR-56 (i.e., Del Mar Heights Road). The traffic generation under this alternative would be similar to the proposed Plan 2. The proposed project would not create a significant direct traffic impact on the area's circulation system.

4) Development without a Phase Shift

The project site could also be developed pursuant to the underlying A-1-10 zoning without a phase shift from Future Urbanizing to Planned Urbanizing. One scenario which could be applied to the project site under the Framework Plan pursuant to Council Policy 600-29 and the Planned Residential Development regulations is development at one dwelling unit per four acres.

A concept plan of a one dwelling unit per four acres with a PRD has been prepared for the Pardee ownership within Pacific Highlands Ranch using three of the SR-56 Alignments: 1) Plan 1 Alignment "F"; 2) Plan 2 Alignment "D"; and 3) the "Central" Alignment. Each concept plan is shown in Figures 8-3, 8-4, and 8-5 of the MEIR, respectively.

For each of these concepts, this alternative would result in approximately 5568 dwelling units, a golf course, driving range, clubhouse, and school park. The total development envelope for the Pardee ownership would occur on approximately 689 acres of the total 1,665-acre Pardee ownership. The residential units would include 416 market rate units

on lot sizes varying from 18,000 square feet to 50,000 square feet and 83 affordable housing units at a density of 20 units per acre. The remaining 855 Pardee acres would remain undeveloped, and as stated in Council Policy 600-29, no future development rights would remain with the property. Each of the other ownerships within Pacific Highlands Ranch (approximately 517 acres) could be developed pursuant to the underlying A-1-10 zoning (one dwelling unit per 10 acres) resulting in approximately 52 additional units for a total of approximately 551 units.

Each of these alternatives could lessen the significant impacts associated with the two proposed subarea plans for Pacific Highlands Ranch. Landform alteration would be substantially reduced with the implementation of this alternative as grading for a golf course in the central portion of the site would be reduced from that necessary for the mixed use core, high school, employment center, and various residential densities. The golf course would also be designed to accommodate the urban amenity. Biologically, the MSCP open space corridor in the northwestern corner of the site would be expanded under this scenario with the elimination of the low-density development area. However, without a phase shift, the MHPA open space as shown in the proposed Subarea Plans 1 and 2 would not be permanently preserved due to the development potential of the remaining A-1-10 ownerships throughout the subarea.

These alternatives would reduce the traffic generation from approximately 55,000-71,010 ADT to approximately 6,660 ADT and the demand on public services and utilities (e.g., police, fire, sewer, water, and schools) would be substantially lessened. Other mitigated impacts of the proposed project, such as impacts to hydrology, cultural resources, geology, paleontology, air quality, noise, and public safety, would be further reduced by implementation of this alternative.

However, development of Pacific Highlands Ranch without a phase shift would have potentially significant land use impacts regarding inconsistencies with the adopted NCFUA Framework Plan. This alternative would not provide the community facilities required in the Framework Plan such as the mixed use core, park and school facilities, and employment center. Also, as noted above, the long-term MSCP preserve regional conservation benefits would not be realized under this alternative.

The major difference among these concept plans is the location of the SR-56 Alignment and the grading associated with the alignment. The non-phase shift land use concepts associated with each alignment are briefly summarized below.

a) Non-Phase Shift Plan 1 (SR-56 Alignment "F")

As shown on Figure 8-3 of the MEIR, this alignment would extend northeast for approximately 2,000 feet to the Carmel Valley Road culvert, then east for approximately 5,000 feet along the north side of McGonigle Canyon, and then northeast for

approximately 6,000 feet within a small canyon that parallels the west side of the existing Rancho Glens Estates subdivision. The future Camino Santa Fe interchange would be located approximately 2,000 feet east of Carmel Valley Road and 1,000 feet north of the confluence of McGonigle and Deer Canyons. A possible second interchange within Subarea III (the third within the proposed middle section of SR-56) could be constructed east if the Rancho Santa Fe Farms Road overcrossing. The total length of this alignment would be 5.6 linear miles.

Plan 1 would locate all but 65 acres of development north of the freeway alignment. A few 30,000 square-foot lots would be located adjacent to the freeway alignment in the western and eastern portion of the site which would require noise attenuation barriers (ranging form 10 to 16 feet in height). By locating the golf course just north of the freeway alignment, noise impacts to the senior high school, community park, and core residential development are eliminated.

b) Non-Phase Shift Plan 2 (SR-56 Alignment "D")

As shown on Figure 8-4 of the MEIR, this alignment would extend northeast for approximately 2,000 feet to the Carmel Valley Road culvert, then north for approximately 5,000 feet along the east side of Carmel Valley Road, and then northeast for approximately 6,000 feet along a ridge that parallels the south side of Black Mountain Road. The future Camino Santa Fe interchange would be located approximately 2,000 feet east of the existing Carmel Valley Road/Black Mountain Road intersection. The additional interchange and total length of the alignment would be about the same as under Concept Plan 1.

Concept Plan 2 would locate the freeway alignment in the middle of the development essentially dividing the community. With this concept plan as with the proposed Subarea Plan 2, the freeway location results in impacts to more land uses. Preliminary engineering studies estimate cut-and-fill volumes of about 2.5 million cubic yards. Noise attenuation barriers (ranging from 8 to 16 feet in height) would be required on both sides of the freeway and retaining walls would be constructed in the eastern portion of the alignment on the south side.

c) Non-Phase Shift Plan 3 (SR-56 Central Alignment)

As shown on Figure 8-5 of the MEIR, this alignment would begin at the southwest corner of Pacific Highlands Ranch as do the other alternative alignments, but instead of traversing northerly up toward the crest of the canyon, this alignment continues easterly in McGonigle Canyon. Near the intersection of McGonigle and Deer Canyons, the freeway would proceed in a northeast direction along the south facing slope of Santa Monica Ridge. The freeway leaves Pacific Highlands Ranch in the southeast section adjacent to the Torrey Highlands community (Subarea IV).

Since the Central alignment would be separated from the community by open space, there would be a reduction in noise impacts for residential units, schools, and parks, in addition to an incremental reduction in air quality impacts related to freeway traffic (fewer vehicle miles traveled).

5) SR-56 Central Alignment Alternative

This alternative plan to the two proposed subarea plans is included to address the possible adoption of the central alignment for SR-56. The SR-56 central alignment is the most direct route between the western portion of Carmel Valley and the eastern portion of Rancho Peñasquitos.

This alignment would enter Pacific Highlands Ranch in the southwest corner of the planning area as shown in the Figure 8-6 of the MEIR. Topographically, this places the freeway in McGonigle Canyon and adjacent to Carmel Creek. However, while the alignment begins at the southwest corner of Pacific Highlands Ranch as do the other alternative alignments, instead of traversing northerly up toward the crest of the canyon, this alignment continues easterly. Near the intersection of McGonigle and Deer Canyons, the freeway would proceed in a northeast direction along the south facing slope of Santa Monica Ridge within Deer Canyon. The freeway leaves Pacific Highlands Ranch in the southeast section adjacent to the Torrey Highlands Community (Subarea IV).

As shown in Figure 8-6 of the MEIR, the land use plan for the Central alignment alternative is similar to the proposed Subarea Plan 1 with the "F" alignment for SR-56. This alternative would include up to 5,500 residential dwelling units; a Town Center and Village area consisting of commercial uses, retail uses, a community green , high-density residential, and a civic area; an employment center; three elementary schools; two neighborhood parks; a community park; one junior high and two high schools (one private and one public); a public library, a fire station; ~~a police substation;~~ and the associated public facilities and transportation network. The limits of development and grading for the land use plan area only would cover approximately 50 percent of the 2,652-acre subarea. Additional disturbance would be required to construct the freeway south of the developed area.

Comparison of Impacts with the Proposed Subarea Plans 1 and 2

Because the proposed number of dwelling units and types of land uses for this alternative are very similar to those proposed in either Subarea Plan 1 or 2, potential impacts related to the size of the development envelope and numbers of vehicle trips generated are similar. The main difference between this alternative and the two proposed Subarea Plans is the location of the SR-56 alignment. In this Alternative the alignment would be located in a sensitive portion of the adopted MHPA but would be separated from the

community by open space. Following is a discussion of those environmental issues most affected by the location of the SR-56 alignment. All other potential environmental impacts are considered essentially similar to either of the proposed subarea plans.

Land Use

In both proposed plans, the freeway would divide the community and the adjacent residential, school, and park uses would experience increased noise and air quality impacts associated with the freeway. Since the central alignment would be separated from the community by open space, there would be a reduction in noise impacts for residential units, schools, and parks, in addition to an incremental reduction in air quality impacts related to freeway traffic (fewer vehicle miles traveled).

Transportation/Traffic Circulation

Like all of the other alignments, this alternative alignment would accommodate projected interregional traffic and would complete a major planned circulation element in the region. While vastly improving regional mobility, there would still be traffic impacts associated with the general growth of the area, not the construction of the freeway. From a traffic perspective this alignment is not very different from either of the Subarea Plan 1 or 2 proposed alignments. Also, the final configuration to have one or two interchanges in Subarea III has little effect on traffic impacts.

Biological Resources

As described in the SR-56 EIR (City of San Diego 1998), adoption of the central alignment would result in significant impacts to biological resources. This alignment would impact a larger portion of sensitive habitat than the other proposed SR-56 alignments because of its location on relatively undisturbed slopes of Deer Canyon. Also, this route would fragment a large portion of the MHPA into 500 and 700 acre portions, compromising the biological integrity of the MHPA. This fragmentation would be a significant unmitigated impact. In addition, this alignment would be a barrier to major wildlife corridors which traverse McGonigle and Deer Canyons. Bridge crossings would be constructed to allow continued wildlife movement.

The central alignment would impact additional areas of sensitive habitat and plants including Diegan coastal sage scrub, scrub oak, chaparral, scrub oak chaparral, southern mixed chaparral, chamise chaparral, non-native grasslands, wetlands, San Diego barrel cactus, and Nuttall's scrub oak. This route would also disturb stands of California adolphia and summer holly. Grading for the alignment would disturb California gnatcatcher territories. Impacts to the above sensitive habitats and species could be mitigated; however, the fragmentation of the MHPA would be a significant and unmitigated impact (City of San Diego 1998). These impacts would not occur under the proposed subarea plans.

Landform Alteration/Visual Quality

Like the proposed Subarea Plans 1 and 2, grading for this alternative would impact a minor area of steep slopes, exceed the city's threshold of 2,000 cubic yards of earthwork per acre; and create manufactured slopes greater than 10 feet high. However, this alternative would result in a freeway alignment with more significant contrast to landform than either of the other subarea plans because of the 80-foot-high cut slope face on the highly visible Santa Monica Ridge. This alternative would also introduce an urban feature into a relatively undisturbed canyon environment, albeit with few sensitive viewers. Thus, the visual contrast between this alignment and the surrounding environment would be substantially increased from the other alignments under Plans 1 and 2. However, because noise impacts to sensitive receivers would be almost entirely avoided under this alignment, the visual impact associated with the noise walls necessary under Plans 1 and 2 would be reduced under the central alignment.

Cultural and Paleontological Resources

It is assumed that the proposed development envelope for the SR-56 central alignment alternative would impact about the same number of significant cultural resource sites as would either the Subarea Plan 1 or 2. However, according to the City draft EIR, the SR-56 central alignment would impact only one sensitive cultural resource site while the Alternative "D" alignment would affect six sites and the Alternative "F" alignment would affect five sites (City of San Diego 1998). According to the same EIR, the central alignment would impact about 25 fewer acres of geologic formations with some paleontological sensitivity. All of the alternatives may be adequately mitigated for significant cultural resources or paleontological impacts with implementation of a CEQA-approved data recovery program.

6) Resource Protection Ordinance Alternative

The identified land use impact associated with the proposed project's inconsistency with the provisions of RPO would be lessened by a project alternative which strictly complies with the encroachment provisions of RPO. Under this scenario, a project alternative that avoids wetland encroachment and floodways, applies wetland buffers adjacent to all wetlands, reduces the excess steep slope encroachment, and avoids impacts to RPO-significant archaeology sites would reduce the identified land use impact (see Land Use, Chapter 4.A, Issue 2). Aside from the land use implications associated with the Framework Plan goals, this alternative would also lessen the other direct and cumulative impacts associated with the proposed Subarea Plans, it is considered environmentally preferable to the proposed projects.

A conceptual alternative land use plan which incorporates these design revisions is shown in Figure 8-7 of the MEIR. Under this conceptual scenario, the number of single-family

units would be reduced by approximately 50 percent as the total on-site development area for residential development and the associated transportation network would be substantially reduced.

Other impacts associated with the proposed subarea plans would also be reduced under the RPO alternative. Impacts to native vegetation and landform alteration/visual quality would be reduced under this alternative. However, substantial earthwork would still be required for the grading for the development areas and the SR-56 alignment, and the impacts would remain significant and unmitigated. With the reduction in dwelling units, the project traffic generation would be reduced from 80,000 ADT to approximately 40,000 ADT. Finally, the demand on public services (schools, parks, police and fire service) and utilities (water, sewer, and solid waste) would be lessened under this alternative.

FINAL MASTER
ENVIRONMENTAL IMPACT REPORT
FOR THE
PACIFIC HIGHLANDS RANCH (SUBAREA III)
SUBAREA PLAN
IN THE
NORTH CITY FUTURE URBANIZING AREA

LDR No. 96-7918
SCH No. 97111077

JUNE 11, 1998

TABLE OF CONTENTS

FIGURES

FIGURES (cont.)

TABLES

TABLES (cont.)

PHOTOGRAPHS

APPENDIXES (bound separately)

Chapter One
Introduction

This Master Environmental Impact Report (MEIR No. 97-7918) addresses the environmental effects associated with implementation of the Pacific Highlands Ranch Plan of the City of San Diego North County City Future Urbanizing Area (NCFUA). This document is informational in nature and is intended for use by City of San Diego decision makers, other responsible or interested agencies, and the general public in evaluating the potential environmental effects of the proposed subarea plan. This MEIR has been prepared by the City of San Diego in compliance with Section 21000 et seq. of the California Environmental Quality Act of 1970, as amended (CEQA); the State CEQA Guidelines (California Code of Regulations, Section 15000 et seq.); and the City of San Diego Guidelines and Format for Environmental Impact Reports (June 1992).

A. Background

The North City Future Urbanizing Area Framework Plan was adopted and the final EIR for the Framework Plan (DEP No. 91-0809) was certified by the San Diego City Council on October 1, 1992. The Framework Plan is a land use policy document that provides general guidelines for development of the 12,000-acre NCFUA, within which Pacific Highlands Ranch is located. The City's Progress Guide and General Plan was amended to incorporate the Framework Plan at the time of its adoption. However, pursuant to the 1985 Managed Growth Initiative (Proposition A), portions of the Framework Plan are not effective until a majority of the voters of the city approve a shift from the Future Urbanizing phase to the Planned Urbanizing phase.

The Framework Plan divides the NCFUA into five subareas, requiring the preparation and approval of detailed subarea plans before development can occur. The purpose of the proposed Pacific Highlands Ranch Plan is to establish a land use plan and an open space system that comply with the requirements of the Framework Plan for the NCFUA and other relevant City plans and policies, including the adopted Multiple Species Conservation Program (MSCP). The Framework Plan requirements for subarea plans include the following:

- Locate specific land uses to achieve the average intensities and land use patterns in the Framework Plan;
- Finalize boundaries of the open space system;
- Determine alignments for roads shown in the Framework Plan;
- Include a school facility financing plan and a City facilities financing plan;
- Designate corridors for nonmotorized transportation including bikeways and equestrian trails;
- Describe how development in the area will satisfy housing requirements;
- Locate public facilities and identify roads necessary to provide access to them;
- Describe how the land uses and policies in the subarea plan and Framework Plan will be implemented; and
- Conform to other City policies and ordinances, including the Resource Protection Ordinance and Council Policy 600-40.

B. Scope of the MEIR and Notice of Preparation

Consistent with Chapter 4.5, Streamlined Environmental Review, of CEQA (Public Resources Code, Sections 21156-21158), an MEIR is being prepared for this project. This MEIR is further intended to be a tiered environmental document building on the previously certified Framework Plan EIR and providing the basis for review and analysis of future projects within the subarea. Both the Framework Plan for the NCFUA, the Framework Plan EIR, and supporting studies are incorporated by reference into this MEIR (CEQA Guidelines Section 15150). These documents are available for review at the City of San Diego Land Development Review Division, 1222 First Avenue, Fifth Floor, San Diego, CA 92101.

The lead agency for this MEIR is the City of San Diego. An Initial Study/scoping letter that addressed the proposed project determined that the proposed Pacific Highlands Ranch Plan may have a significant effect on the environment and that an MEIR should be prepared which would address the following potentially significant issues: land use, transportation/traffic circulation, biological resources, hydrology/water quality, landform alteration/visual quality, cultural resources, air quality, geology/soils, natural

resources/agriculture, paleontological resources, noise, public facilities and services, water conservation, and safety.

Each of Pacific Highlands Ranch's potentially significant environmental effects is presented in Chapter 4. For each issue under analysis, the MEIR contains a discussion of the existing conditions, potential impacts, identification of the significance of the impacts, and mitigation measures for those impacts that are identified as significant. Significant environmental effects that could not be avoided if the project were to be implemented as proposed are identified in the impact section of each topic and briefly summarized at the beginning of this report. Chapters 5, 6, and 7 contain discussions of growth inducing effects, cumulative impacts, and CEQA-mandated discussions areas: the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; significant irreversible environmental changes; and effects found not to be significant. Alternatives to the proposed project are presented in Chapter 8. The MEIR preparation staff, persons and agencies consulted, and references cited are listed in Chapters 9, 10, and 11. The technical and supporting materials discussed and cited in the text are bound under separate cover in the appendixes.

A Notice of Preparation (NOP) was distributed for the project on November 19, 1997. Responses to comments received during the NOP public review period are incorporated in the text of the EIR in the appropriate locations. The NOP and response letters are included in Appendix A of this document.

C. Uses of this MEIR and Future Project-Specific Review

The Pacific Highlands Ranch Plan MEIR is being prepared and processed concurrently with the Pacific Highlands Ranch Subarea Plan. Appropriate decision makers will consider the information contained in this MEIR when considering the proposed project. The discretionary actions associated with the proposed project include adoption of the subarea plan; amendments to the NCFUA Framework Plan, the City's Progress Guide and General Plan, the Master Rezone, and the North City Local Coastal Program; and various amendments to the Municipal Code.

Because portions of the subarea lie within the Coastal Zone, development within those areas will require individual Coastal Development permits issued by the State Coastal Commission. Certification by the Coastal Commission of the Subarea Plan as an amendment to the Local Coastal Program (LCP) would also be required. Resource Protection Ordinance (RPO) permits would be required for the portions of the subarea that lie outside of the Coastal Zone. In addition, permits from the following agencies may be required to implement future individual development projects with the subarea:

California Department of Fish and Game
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
San Diego Regional Water Quality Control Board
San Diego Air Pollution Control District
California Department of Transportation

It is the intent of this MEIR to streamline future environmental review of subsequent development, including tentative maps and development permits, by analyzing the potential impacts of the Pacific Highlands Ranch Subarea Plan at a level that will be sufficient for future projects where possible and to provide a framework for future impact analysis and mitigation consistent with this MEIR. Anticipated future projects would include tentative subdivision maps and planned development permits for the 1,665-acre Pardee Construction Company ownership, a conditional use permit for a private high school on the 54-acre Catholic Church ownership, development plans for the designated elementary school and high school sites by the affected school districts, and tentative subdivision maps for the several other ownerships within the subarea.

At the time an application for a future project is submitted, the City will prepare an Initial Study to determine whether the project may cause any significant impact that was not examined in the MEIR and whether the project was described as being within the scope of the Pacific Highlands Ranch Subarea Plan. If it is determined that the subsequent project will have no new or additional significant impacts and whether the subsequent project was described in the MEIR as being within the scope of the project, then written findings can be made based on the Initial Study and no new environmental document will be required. If the Initial Study findings cannot be made, then either a Mitigated Negative Declaration or Focused EIR will be required as specified in CEQA Sections 21157.5 and 21158. Use of this MEIR is further limited in accordance with CEQA Section 21157.6.

Chapter Two
Environmental Setting

A. Project Location

Pacific Highlands Ranch consists of approximately 2,652 acres located in the northwestern portion of the city of San Diego, approximately one mile east of the city of Del Mar (Figure 2-1). Generally, Pacific Highlands Ranch lies between Interstate 5 (I-5) and Interstate 15 (I-15) in the North City Future Urbanizing Area, as shown in Figure 2-2. It is south of Fairbanks Ranch and the San Dieguito community planning area in the county of San Diego, east of El Camino Real and Carmel Valley and north of Shaw Ridge Road and the Los Peñasquitos Canyon Preserve. Undeveloped Torrey Highlands (Subarea IV) of the NCFUA is located immediately east of the project site.

B. Site Characteristics and Existing Land Uses

The topography of Pacific Highlands Ranch ranges from approximately 40 feet above mean sea level (MSL) in Gonzales Canyon at the northwestern corner to approximately 428 feet above MSL in the southeastern corner of the subarea (Figure 2-3). Mesas, gently sloping hillsides, and canyons traverse the project site. The main topographic features on the project site include Gonzales Canyon in the northeast, McGonigle and Deer Canyons and Santa Monica Ridge in the southern portion of the site, and Del Mar Mesa along the southern site boundary. The project site is located within the watersheds of La Zanja Canyon to the north, Gonzales Canyon to the west, and McGonigle Canyon to the south. Runoff from the project site drains through these canyons either to Carmel Valley in the south or into the San Dieguito River to the north.

Existing land uses within the agriculturally zoned (A-1-10) Pacific Highlands Ranch include extensive agricultural acreage, several nurseries, horse ranches, scattered large-lot single-family homes associated with the agricultural/nursery operations, an approved borrow area, trailers used as nursery/agricultural worker housing, a pet housing facility, and a 29-unit single-family residential development known as Rancho Glens Estates

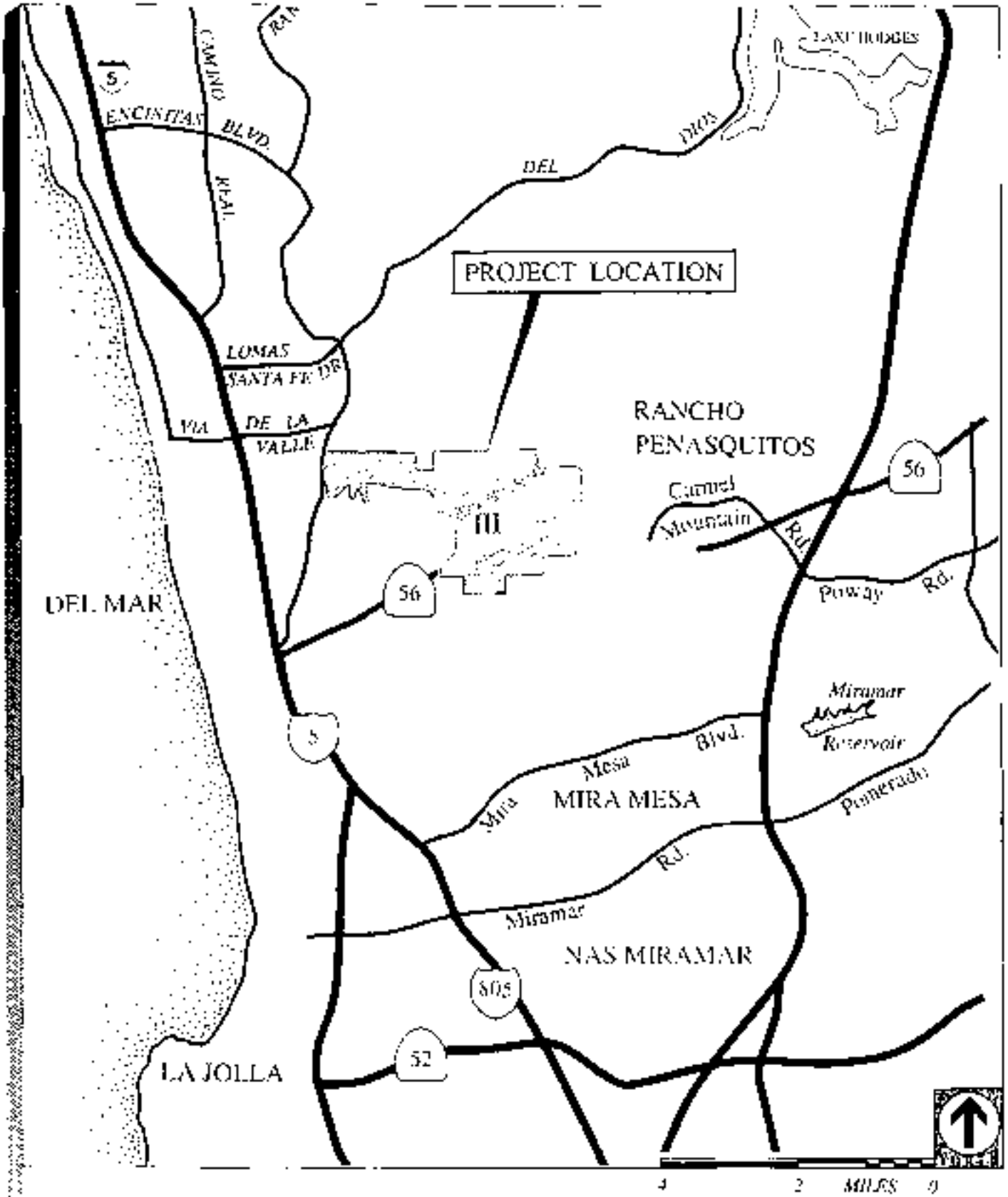
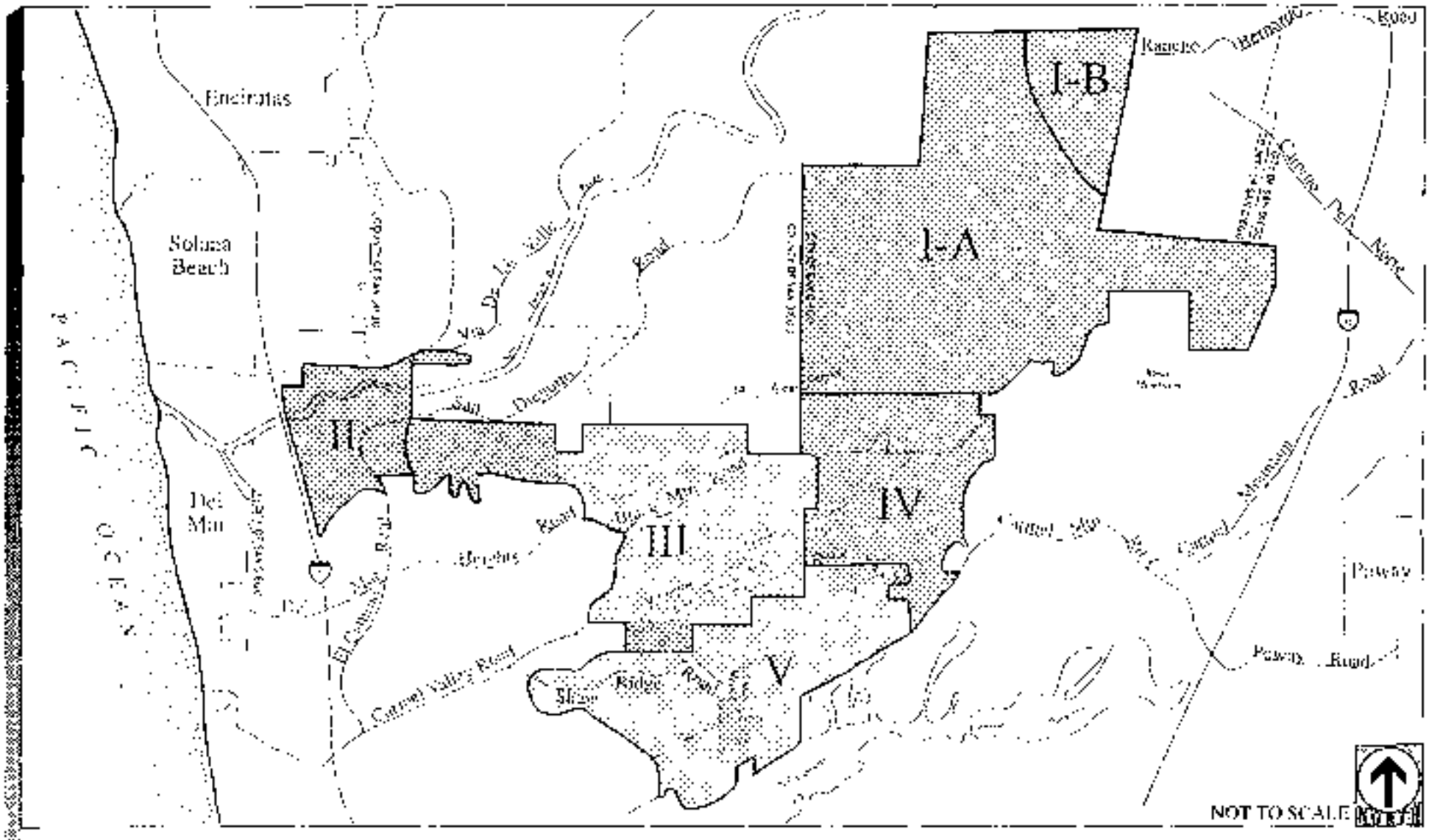


FIGURE 2-1

Regional Location of the Project



Source: Helix Environmental Planning Inc. 1995

Future Urbanizing Area

FIGURE 2-2

North City Future Urbanizing Area Planning Subareas

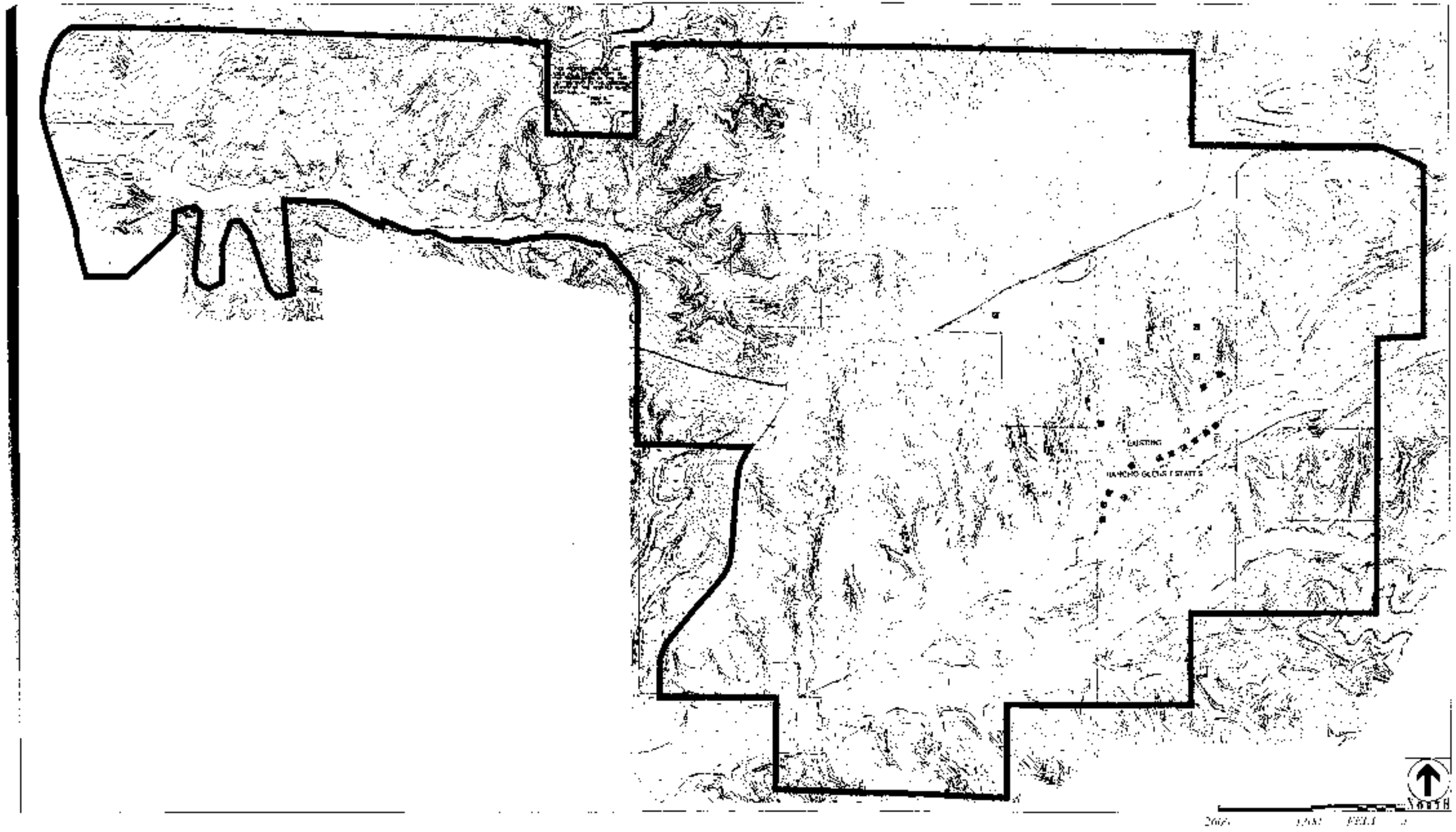


FIGURE 2-3

Existing Site Topography

along Caminito Mendiola. The nursery operations are mainly located along Black Mountain Road and grow flowers, palms, and other plants for landscaping purposes. The prime agricultural product in the project area is pole tomatoes. A north-south San Diego Gas & Electric (SDG&E) power line easement containing a high-power overhead electrical distribution line extends along the eastern boundary and a main water line, and two trunk sewer lines also traverse the site. The remaining on-site acreage includes roads and open space, much of which is in a disturbed condition.

A variety of vegetation types occur within Pacific Highlands Ranch, including Diegan coastal sage scrub, southern maritime chaparral, grasslands, eucalyptus woodlands, coyote bush scrub, southern mixed chaparral, scrub oak chaparral, and riparian communities (southern sycamore riparian woodland, mule fat scrub, southern willow scrub, and southern riparian scrub). In addition, 15 sensitive plant species and 8 sensitive animal species have been observed on the property.

Access to Pacific Highlands Ranch is currently provided by Black Mountain Road, which traverses the site in an east/west direction between Del Mar Heights Road and Rancho Peñasquitos. Carmel Valley Road also provides access to the western portion of the site from the current terminus of State Route (SR-56). Regional access to the subarea is from I-5 via Del Mar Heights Road and SR-56.

C. Surrounding Land Uses

Land uses surrounding Pacific Highlands Ranch consist primarily of open space and residential uses. Figure 2-4 is an aerial photograph showing the adjacent land use patterns. Specifically, the Del Mar Country Club (golf course and estate residential uses), Fairbanks Ranch (estate residential), Senterra development (low density residential), The Lakes project (estate residential in the county of San Diego), and a nursery occur along the northern boundary. Vacant undeveloped lands within Subareas IV and V exist adjacent to Pacific Highlands Ranch on the east and south, respectively. Shaw Ridge Road (dirt) parallels the southern boundary off-site within Subarea V. The surrounding land uses to the west consist of low density residential development within the Carmel Valley community planning area both north and south of Carmel Valley.

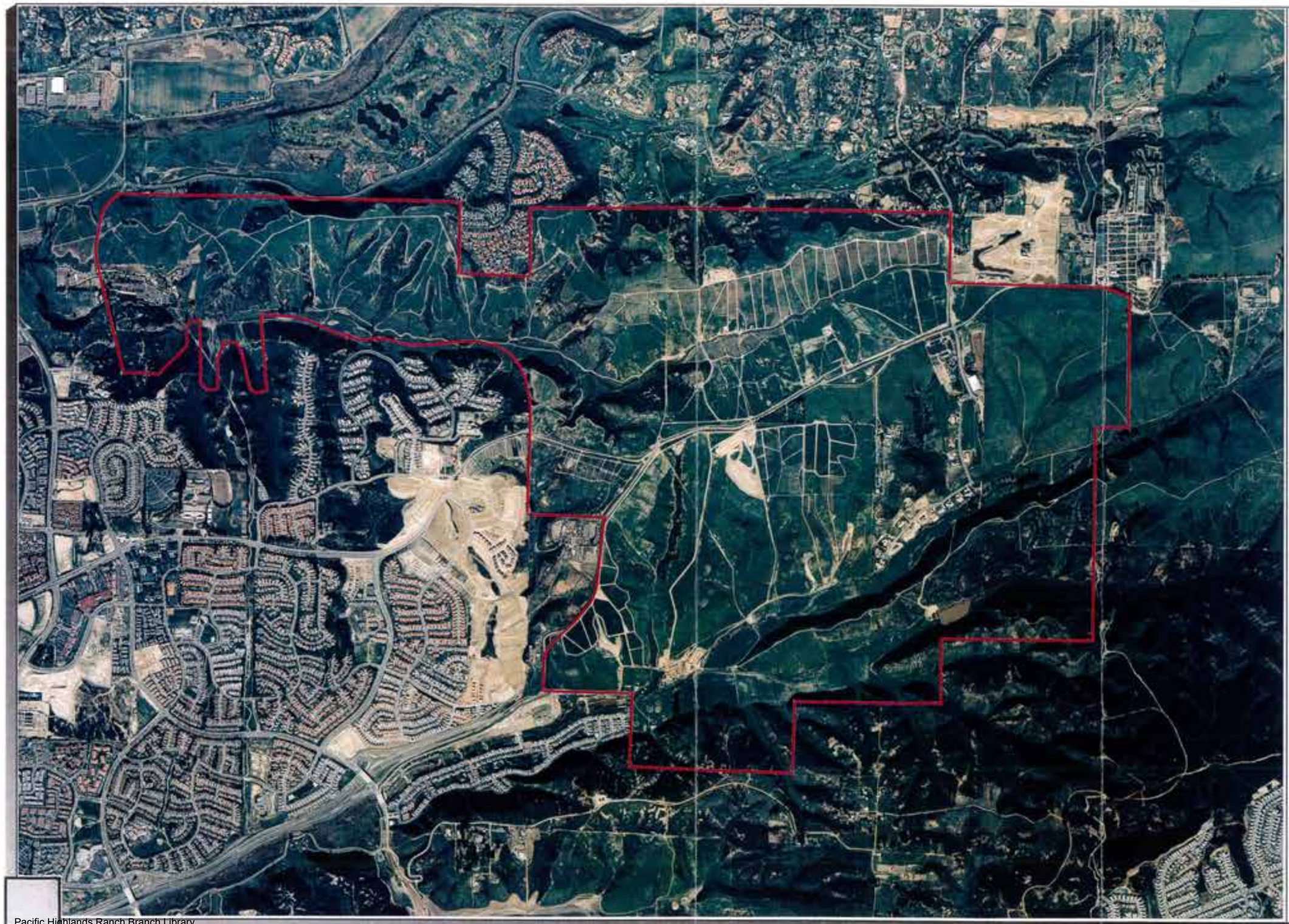


FIGURE 2-4

Aerial Photograph of Subarea III and Surrounding Land Uses

North

D. Existing City Plans, Policies, and Regulations

1) Framework Plan and Zoning

The Framework Plan for the approximately 12,000-acre NCFUA was adopted by the City of San Diego in 1992. It establishes preliminary roadway alignments, open space boundaries, and land use patterns for the NCFUA, serving as a guideline for the creation of more specific land use plans for each of the five subareas. The Framework Plan amended the City's Progress Guide and General Plan (General Plan). Where the Framework Plan is more specific than the General Plan, it supersedes the General Plan. Pacific Highlands Ranch is one of the five NCFUA subareas and is currently zoned A-1-10 (one dwelling unit per 10 acres), with hillside review overlay zones concentrated along its northern, western, and southern boundaries. The A-1-10 zoning is intended as a holding zone until approval of the subarea plans and associated phase shift.

The City Council approved a new zone code in late 1997; however, before it can take effect it must be approved by the State Coastal Commission. Hearings are planned for the spring of 1998. Subarea III would be subject to the updated Zoning Code. Provision is made in the new zone code for a conversion from the existing code to the new code. For example, the City's Resource Protection Ordinance would be replaced by the Environmentally Sensitive Lands Ordinance.

2) Managed Growth Initiative

On November 5, 1985, the electorate of the City of San Diego approved the Managed Growth Initiative (Proposition A), amending the General Plan such that "No property shall be changed from the 'future urbanizing' land use designation and the provisions restricting development in the future urbanizing area shall not be amended except by majority vote of the people" (City of San Diego 1989).

3) City Council Policies

a) Council Policy 600-29

Without approval of the Pacific Highlands Ranch Plan and associated General Plan Amendment (GPA), development in Pacific Highlands Ranch and the rest of the NCFUA is presently regulated by the underlying zone and City Council Policy 600-29, "Maintenance of Future Urbanizing Area as an Urban Reserve." City Council Policy 600-29 was approved in July 1981 and provided four means of development. These are:

- Development as allowed under the existing A-1 zoning regulations, at the density and minimum lot size permitted;

- Development as a planned residential development (PRD) under the Rural Cluster Development regulations with the number of residences allowed by the underlying zone (A-1-10, A-1-5), but clustered to promote more efficient land utilization and conservation; the undeveloped portions could be developed at some future date at higher densities subject to adoption of a community plan, precise plan, or specific plan; rezoning; and a phase shift to Planned Urbanizing;

- Development as a PRD at a maximum density of one unit per four acres, but only if clustered (grouped into more compact areas) in a portion of the property and no future development rights remain on the undeveloped portion of the property; and

- Development under a conditional use permit (CUP).

Council Policy 600-29 was amended in November 1990 to restrict the allowable development with a CUP to uses that are natural resources dependent, nonurban in character, or interim uses. Additional criteria for the preceding list of development alternatives were also provided. Development with a PRD at a density of one unit per four acres is now permitted "in order to promote the permanent preservation of land designated in the General Plan as part of the Environmental Tier." Development with the number of units allowed by the underlying zone was amended to allow development according to the Rural Cluster Development regulations. This option includes clustering to:

- Promote more efficient land utilization and land conservation;

- Allow development in patterns more consistent with those occurring in adjacent areas;

- Avoid fragmentation of land ownership patterns which would mitigate against future development opportunities;

- Allow for reasonable development opportunities during the planning period without foreclosing future development choices; and

- Make annexation of unincorporated lands more attractive where such land will be brought into the Future Urbanizing area.

b) Council Policy 600-30

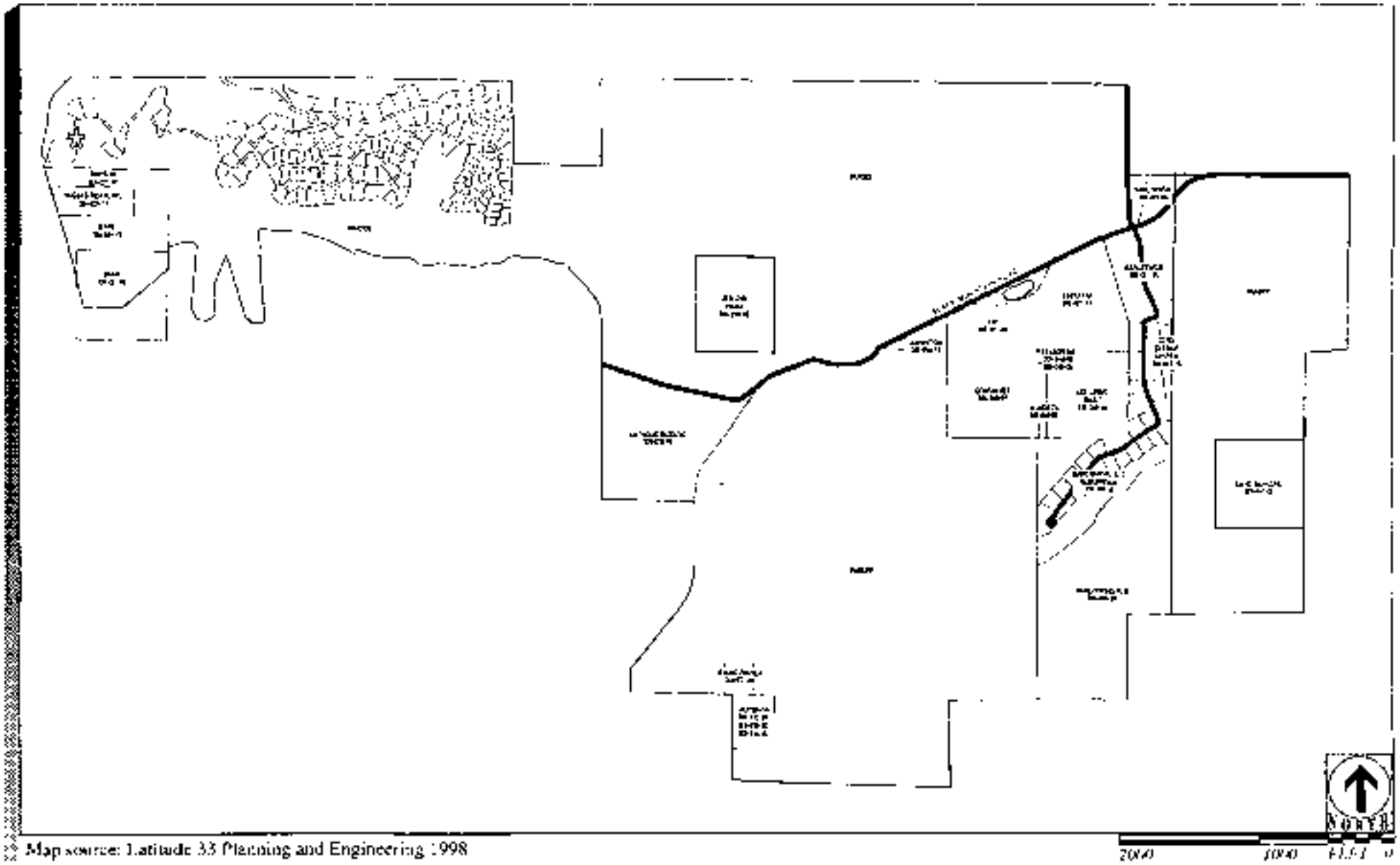
City Council Policy 600-30, "General Plan Amendments to Shift Land from Future Urbanizing to Planned Urbanizing Area," was amended after the approval of Proposition A. This council policy states that no land shall be shifted from the Future Urbanizing area to the Planned Urbanizing area except by a GPA approved by the City Council and approved by a majority vote of the people. The policy further states that once land is shifted to the Planned Urbanizing area, rezones and other development approvals shall be in accordance with applicable City requirements.

c) Council Policy 600-40

Council Policy 600-40 was created in order to ensure that the preparation and adoption of long-range plans for the city include a thorough analysis of the constraints and opportunities of the planning area, including but not limited to the resources protected by the City's Environmental Sensitive Lands (City of San Diego 1991). In addition to ensuring a thorough analysis of the site at an early stage in the planning process, the purpose of 600-40 is to (1) aid in the review of permits and maps in the planning area, (2) ensure protection of environmental resources by preserving contiguous open space systems and providing mechanisms to acquire or protect these resources, and (3) ensure that adopted land use policies and objectives are considered in the context of the suitability of the plan area for development (City of San Diego 1991).

According to Council Policy 600-40, a development suitability analysis is to be conducted for all long-range plans, such as the Pacific Highlands Ranch Plan, to ensure that environmental resources and other site constraints and opportunities are fully considered in preparation of the plan. This policy goes on to state that "Development, including land uses, roads, and other facilities, shall be distributed so as to minimize encroachment into hillsides, biologically sensitive lands, significant prehistoric and historic resources and other resources addressed in RPO. Mechanisms to protect these resources must be addressed in the long-range plans in sufficient detail to adequately evaluate future applications for permits and maps in the planning area, and to ensure reasonable use of land or appropriate compensation for all property owners." Figure 2-5 shows the existing ownership patterns within Pacific Highlands Ranch. It is the City's objective that substantial habitat acreages be preserved by implementing the long-range plan, which could not be achieved if the property was developed on a parcel-by-parcel basis.

Council Policy 600-40 also requires that the City Manager's recommendation on the draft plan be based upon the site suitability analysis, which enables decision makers to determine the consistency of the plan with RPO and other adopted General Plan and City Council policies and objectives. If future projects or permit applications within the precise plan area are found to be consistent with the precise plan, future RPO permits



Map source: Latitude 33 Planning and Engineering 1998

FIGURE 2-5

Ownership Map

may be approved using the "Substantial Conformance" provision in the alternative compliance process contained in RPO. If a long-range plan is found not to be consistent with RPO, then an alternative concept plan shall also be presented to the decision maker which would be consistent.

E. Related Planning and Development Projects

Related specific and community plan projects within and adjacent to the NCFUA include the subarea plans for Subareas I-A, IV, and V; adopted Carmel Valley precise plans to the west and south; and buildout of the Fairbanks Country Club Specific Plan and the County's San Dieguito Community Plan to the north. In addition to buildout of the community and specific plans and proposed development projects in the area, the following regionally significant projects are described below:

State Route 56: The middle segment of this state freeway is currently the subject of a City draft EIR. The middle segment of SR-56 would be extended through Subareas III and IV of the NCFUA, connecting with existing segments of SR-56 located to the east and west of the NCFUA. The City of San Diego, as lead CEQA agency, prepared an initial draft EIR which was released for public review in December 1996. Two alignments (northern and central) are examined in the draft EIR. Based on comments received during the public review period, a revised draft EIR was released in January 1998 which examines two additional northern alignments (i.e., Alignments "D" and "F") for SR-56. These two northern alignments form the basis for the two Pacific Highlands Ranch Plans which are addressed in the body of this EIR. The central alignment is, however, included as a project alternative in Chapter 8 of this document.

Multiple Species Conservation Program: In 1991 the City of San Diego and other land use jurisdictions in southwestern San Diego County began development of the Multiple Species Conservation Program to meet the Metropolitan Wastewater Department's need to mitigate the direct biological impacts associated with mandated improvements to the region's sewage treatment facilities. The MSCP effort was also directed toward mitigating the secondary biological impacts associated with projected growth in the region.

The MSCP is designed to identify lands that would conserve habitat for federal and state endangered, threatened, or sensitive species, including the federally listed threatened California gnatcatcher. The MSCP has been found to be the equivalent of a Natural Community Conservation Plan for the area, consistent with the federal Endangered Species Act Section 4(d) rule for the coastal California gnatcatcher that would define conditions under which "take" of

the species could occur without violation of the Endangered Species Act. That is, the MSCP is a plan and process for the issuance of permits under the federal and state Endangered Species Acts and the state's Natural Community Conservation Planning Act of 1991.

On March 18, 1997, the City of San Diego adopted the MSCP. An objective of the MSCP is to conserve a connected system of biologically viable habitat lands in a manner that maximizes the protection of sensitive species and precludes the need for future listings of species as threatened or endangered. Responsibilities for conservation planning in the MSCP study area are organized by subareas. The input from the jurisdictions and other special district and agency participants is summarized in the Multiple Habitat Planning Area (MHPA) maps (Figures 3-2, 3-3, and 3-4 of the MSCP).

The MHPA is the area within which the permanent MSCP preserve will be assembled and managed for its biological resources. The MHPA is defined in many areas by mapped boundaries, as mentioned above in the referenced figures of the MSCP, and also is defined by quantitative targets for conservation of vegetation communities and goals and criteria for preserve design. Within the NCFUA, the MHPA boundaries are as shown in the Biology section of this MEIR. Resources to be preserved in the MHPA include coastal sage scrub, southern maritime chaparral, various wetland habitats, and many sensitive and/or listed plants and animals. The MHPA in this area is largely comprised of regional linkages leading to biological core areas within existing reserves and parks. The City of San Diego MSCP Subarea Plan with respect to the NCFUA states the following: "Subareas III and IV contain only extended regional corridors, linking to the north, west, and south. These corridors primarily lie in canyons or drainages, and the majority require restoration to enhance their long-term value."

On July 14, 1997, the City of San Diego signed an Implementing Agreement with the U.S. Fish and Wildlife Service and California Department of Fish and Game. The Implementing Agreement is the contract between the City and the wildlife agencies, which outlines the obligations and commitments made for the successful completion of the MSCP. The agreement has been signed by all parties and is effective July 17, 1997.

The Implementing Agreement now allows the City of San Diego to issue Incidental Take Authorizations under the MSCP. The Incidental Take Authorizations replace the Interim Habitat Loss 4(d) permit that was established in August 1994 for permitting take of the California gnatcatcher and its associated habitat, coastal sage scrub.

Carmel Valley Neighborhood 8A: Carmel Valley Neighborhood 8A is one of the 13 "neighborhoods," or development units, described within the Carmel Valley Community Plan. Neighborhood 8A lies approximately one mile southwest of the southern boundary of Pacific Highlands Ranch. Much of this precise planning area consists of very high quality coastal sage scrub vegetation and southern maritime chaparral with numerous sensitive plant and animal species and is part of the Carmel Mountain biological core area.

Precise plans have been proposed for Neighborhood 8A in both 1994 and 1995 and final EIRs have been completed. A noticed public hearing was held on the precise plan on January 24, 1995, but no action has been taken by the City Council. More recently in late 1995, Neighborhood 8A was a component of the 1995 City Manager's Neighborhood 8A Compromise Plan (DEP No. 87-0211, 91-0899, and 94-0576), which included a revised Neighborhood 8A Precise Plan. Another final EIR was prepared for the Neighborhood 8A Compromise Plan, and a noticed public hearing was held on the project on October 31, 1995. No action has been taken on any of the Compromise Plan project components by the City Council, although the Compromise Plan was analyzed in the final MSCP EIR.

Currently, another comprehensive planning effort is being undertaken for Neighborhood 8A and another draft EIR is being prepared which examines several land use scenarios. Each of these development scenarios for Neighborhood 8A are directly related to the land use plans being proposed for Pacific Highlands Ranch through the proposed development agreement between the applicant, Pardee Construction Company, and the City of San Diego. The Development Agreement provides a package of development rights, land dedications to the MSCP, purchase options, the right-of-way for SR-56, and the dedication of lands within Carmel Valley Neighborhood 8A. The high-quality vegetation within Neighborhood 8A includes numerous sensitive plant and animal species. The City of San Diego and several environmental and community groups have identified preservation of Neighborhood 8A as being critical to city-wide preservation efforts. This off-site parcel within Neighborhood 8A is also owned by Pardee Construction Company, who is also the majority landowner within Pacific Highlands Ranch. The effect of this off-site dedication to the MHPA would be to increase preservation of scarce Tier I resources while allowing development on less sensitive non-native grasslands within Pacific Highlands Ranch. The "package" included in the Development Agreement provides certain assurances to Pardee and extraordinary benefits to the City.

Chapter Three
Project Description

A. Project Background

Pacific Highlands Ranch is one of five subareas that comprise the 12,000-acre North City Future Urbanizing Area in the city of San Diego. The NCFUA is nearly surrounded by developed or developing land. A Framework Plan for the entire NCFUA was adopted by the City Council and a final EIR was certified in August 1992.

The adopted Framework Plan requires that individual plans be prepared for NCFUA subareas that were defined as part of the Framework Plan with each to include specific types and locations of development, locations of major public facilities (e.g., schools and parks), infrastructure needs, and financing requirements. Thus, the purpose of the proposed Pacific Highlands Ranch Plan is to establish a land use plan and open space system that generally comply with the requirements of the NCFUA Framework Plan, the Multiple Species Conservation Plan (MSCP), and other relevant City plans and policies.

The Framework Plan requirements for subarea plans include the following:

- Locate specific land uses relative to the land use patterns in the Framework Plan;
- Establish the open space system;
- Determine precise alignments for circulation element roads which are shown in the Framework Plan;
- Designate corridors for nonmotorized transportation including bikeways and equestrian trails;
- Locate public facilities and access;
- Develop an implementation plan; and

- Demonstrate conformance with City policies and ordinances, including the Resource Protection Ordinance, Council Policy 600-42, Street Design Manual, Landscape Technical Manual, and Transportation System Management.

To date, subarea plans have been approved for Subareas IV (Torrey Highlands) and V Del Mar Mesa), and one is currently being prepared for Subarea 1 (Black Mountain Ranch). Based on the Managed Growth Initiative of 1985, all proposed subarea plans and associated phase shifts to the "planned urbanizing area" would require a majority vote of the people.

A draft subarea plan for Pacific Highlands Ranch was proposed in 1993 which included 6,500 dwelling units, 400,000 square feet of commercial and office use, and associated public facilities and transportation network. The Rancho Glens Estates residential subdivision in the central portion of the subarea was approved in 1986 consistent with the underlying zoning; lots have been sold and some homes have been built. Because of the uncertainties regarding State Route 56 and the failure of a July 1993 ballot measure which would have resulted in a phase shift of the entire NCFUA, the above Pacific Highlands Ranch planning efforts were put on hold.

Subsequent to this initial planning effort, four individual projects within the original Pacific Highlands Ranch have been approved. These projects include the Del Mar Highlands Estates PRD, Pet Facility CUP, and Barne Parcel subdivision, and Seabreeze Farms. A PRD/vesting tentative map (VTM) was approved for Del Mar Highlands Estates in April 1997 consistent with the underlying zoning. Grading and construction has begun. Because a phase shift was not required for Del Mar Highlands Estates, this 389-acre property remains in Pacific Highlands Ranch. The Pet Facility CUP was approved in 1996 at the southwestern corner of the subarea in Carmel Valley, and the subdivision of the Barne Parcel (four units) consistent with underlying zoning was approved in 1995. The 72-acre Seabreeze Farms project was approved by the City Council in July 1996 and a phase shift to Planned Urbanizing was approved by the voters in November 1996. The Seabreeze Farms project area on the western boundary has been excluded from the current Pacific Highlands Ranch boundaries as it is now part of the Carmel Valley community planning area.

With the removal of Seabreeze Farms from the boundaries of Pacific Highlands Ranch, the project area now consists of approximately 2,652 acres within the overlying NCFUA. The majority of the subarea consists of undeveloped land, with agricultural uses occurring over much of the site. The proposed subarea plan would refine the existing NCFUA Framework Plan by proposing specific locations for roads and siting and land use designations for future commercial, residential, and public facility land uses. The adoption of a subarea plan is a prerequisite for voter consideration of a General Plan phase shift from Future Urbanizing to Planned Urbanizing, and no approvals for specific development under the subarea plan are being considered at this time.

B. Project Goals and Objectives

The overall goal of the proposed subarea plan is to refine the land use plan, circulation plan, and open space preserve design for the MSCP in Pacific Highlands Ranch in a manner that is generally consistent with the NCFUA Framework Plan. In addition, the specific objectives include the following:

- Establishment of a land use plan that provides housing and job opportunities for residents while maintaining an acceptable quality of life standard within the subarea;

- Implementation of the MSCP and establishment of an open space system which preserves environmentally sensitive lands, provides a functional and regionally connected wildlife corridor system, complies with the City's Resource Protection Ordinance, and is consistent with regional wildlife and environmental planning efforts;

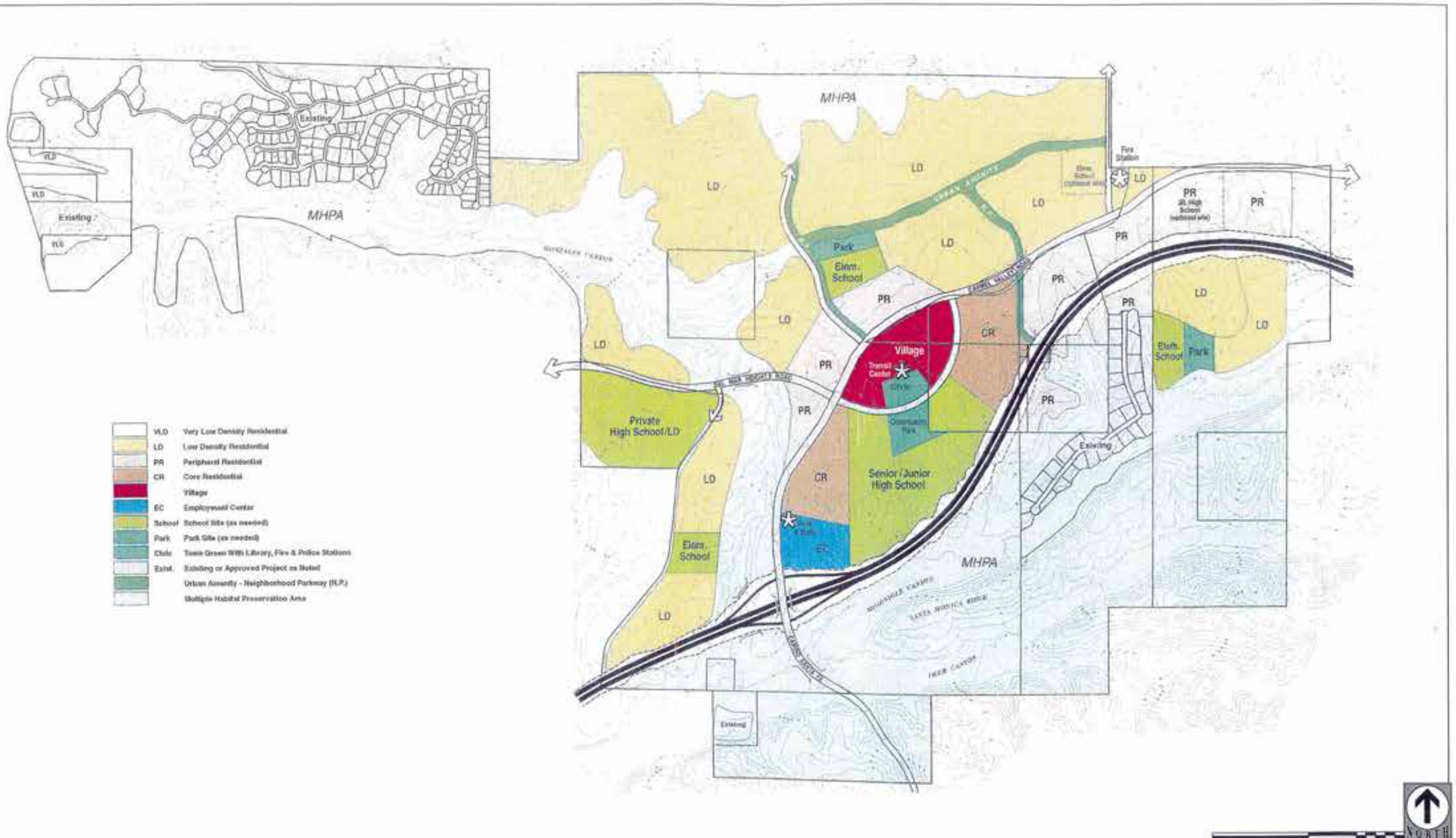
- Control and management of regional growth by establishing a phased approach to NCFUA development, ensuring that necessary public facilities are in place at the time of need, and providing for the siting and financing of such facilities; and

- Assurance that the subarea planning process complies with all City and regional policies, regulations, and programs.

In order to develop a subarea plan that meets the goals of the Framework Plan and the objectives of the property owners within the subarea, along with the circulation and open space goals of the City of San Diego, the subarea plan has been developed in concert with numerous interested groups. These include the Sierra Club, Carmel Valley Community Planning Board, City of San Diego Development Services Business Center, City of San Diego Public Works Business Center, League of Women Voters, and the Endangered Habitats League. Numerous meetings and site visits were held in 1997 and 1998 to develop a draft subarea plan which addressed the concerns of the interested parties.

C. Land Use Summary

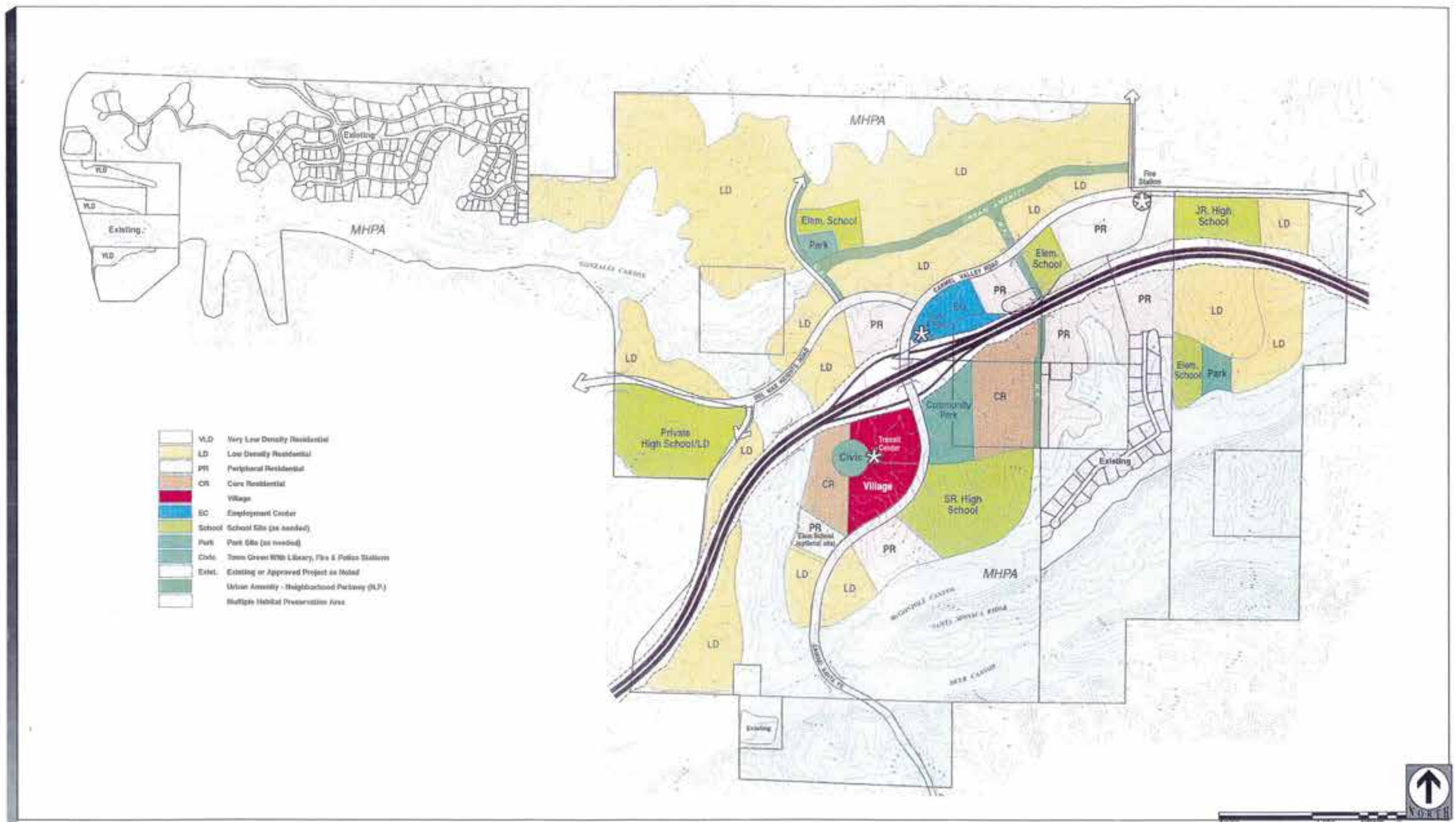
This MEIR addresses two separate land use plans (Figures 3-1 and 3-2) which incorporate two proposed northern alignments for the middle segment of SR-56. These two northern alignments are currently being evaluated by the City in a revised draft EIR released on January 21, 1998. The alignments are based on public input received during the public review of the January 1997 draft City EIR which evaluated two other alignments: a Northern and Central one for the middle portion of SR-56. All of the alignments would pass through Pacific Highlands Ranch.



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-1

Subarea III Land Uses - Plan 1



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-2

Subarea III Land Uses - Plan 2

Source: Latitude 33 Planning and Engineering 1998

FIGURE 3-3

Aerial Photograph of Project Site Showing SR-56 Alignments and Ownership Patterns

Figure 3-3 illustrates the two proposed alignments for SR-56 addressed in this EIR and their relationship to Pacific Highlands Ranch as well as ownerships within Pacific Highlands Ranch affected by the alignments. Table 3-1 summarizes the proposed land use designations and acreages for each plan, and Table 3-2 summarizes the proposed master rezoning of the site. Both land use plans illustrate the alignments for major streets and SR-56; pedestrian, bicycle, and equestrian trails; a Town Center and Village area; an employment center; sites for schools, parks, and other public facilities; transit facilities; delineation of MSCP open space, wildlife corridors, permanent open space areas, and urban amenity areas; and design principles and standards for future development. A Resource Protection Ordinance analysis and Council Policy 600-40 development suitability analysis has also been prepared for both subarea plans. Both plans are summarized below.

1) Subarea Plan 1 (SR-56 Alignment "F")

As proposed, Subarea Plan 1 includes up to 4,974 new residential dwelling units; a Town Center and Village area consisting of commercial uses, retail uses, a community park, a community green, high-density residential, and a civic area; an employment center; three elementary schools; two neighborhood parks; one junior high and an optional junior high; two high schools (one private and one public); a public library; a fire station; and the associated public facilities and transportation network. The limits of development and grading would cover approximately 50 percent of the 2,652-acre subarea. The remaining 50 percent of the site would comprise an open space preserve, including a trail system, which is functionally equivalent with the adopted City of San Diego Multiple Species Conservation Plan. There would be a potential increase in the maximum number of dwelling units (up to 5,456) should the private high school site, junior high school, and one of the elementary school site are redesignated for residential uses.

The major circulation element roads consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor. Subarea Plan 1 includes SR-56 "Alignment F" as described in the SR-56 revised draft EIR, which is currently being prepared by the City of San Diego.

2) Subarea Plan 2 (SR-56 Alignment "D")

Subarea Plan 2 incorporates a more northerly alignment for SR-56. This alignment, referred to as Alignment "D" in the SR-56 revised draft EIR, traverses Pacific Highlands Ranch in a diagonal manner and alters the backbone circulation system and land use plan proposed under Plan 1. Figure 3-2 shows the proposed land use plan under this scenario. Subarea Plan 2 includes up to 4,974 new residential dwelling units; a Town Center and Village area with the same uses described above on the south side of SR-56; three elementary schools, two neighborhood parks; a community park; a community green; one

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TABLE 3-1

SUBAREA III LAND USE DESIGNATIONS

Land Use	Code	Plan 1			Plan 2	
		du/ac	Dwelling Units	Acres	Dwelling Units	Acres
Proposed Projects						
Estate Residential	ER	0-0.25	0	0	0	0
Very Low Density Residential	VLD	0.25-1	12	12	12	12
Moderately Low Density Residential	MLD	1.1-2	0	0	0	0
Low Density Residential	LD	2.1-5	2,368	544	2,352	535
Peripheral Residential	PR	5.1-9	1,098	143	1,232	147
Core Residential	CR	9.1-14	996	60	878	55
Village	V	34	500	33	500	33
Employment Center	EC	None	0	20	0	17
School Site (as needed)	SCHOOL	None	0	152	0	155
Park Site (as needed)	PARK	None	0	24	0	31
Town Green	CIVIC	None	0	8	0	8
Multiple Habitat Planning Area	MHPA	None	0	1,268	0	1,266
SR-56 and Major Roads		None	0	213	0	218
Subtotal			4,974	2,477	4,974	2,477
Existing or Approved Projects						
Rancho Glen Estates	ER	0-.25	29	43	29	43
Barne Property	ER	0-.25	4	10	4	10
Del Mar Highlands Estates	ER/PR	0-.25/5-9	172	116	172	116
Existing CUP	ER	0-.25	3	6	3	6
Subtotal			208	175	208	175
TOTAL			5,182	2,652	5,182	2,652

TABLE 3-2
PROPOSED ZONING CATEGORIES

Existing Zoning Designations	New Zoning Designations
R-1-40	RS-1-8
R-1-10	RS-1-11
R-1-6	RS-1-13
R-1-5	RS-1-14
R-1-5/SLO	RX-1-1
R-3000	RT-1-2
R-2500	RM-1-2
R-2000	RM-1-3
CA	CC-1-3
MIP	IP-2-1

junior high and an optional junior high, one public and one private high school; an employment center; a public library; a fire station; and the associated public facilities and transportation network. As with Subarea Plan 1, the limits of development and grading would cover approximately 50 percent of the 2,652-acre subarea, and the remaining 50 percent of the site would comprise an open space preserve which is functionally equivalent with the adopted City of San Diego Multiple Species Conservation Plan. The open space preserve would include a trail system. As described for Plan 1, there would be a potential increase in the maximum number of dwelling units (up to 5,414) should the private high school site, junior high school, and one of the elementary school site are redesignated for residential uses.

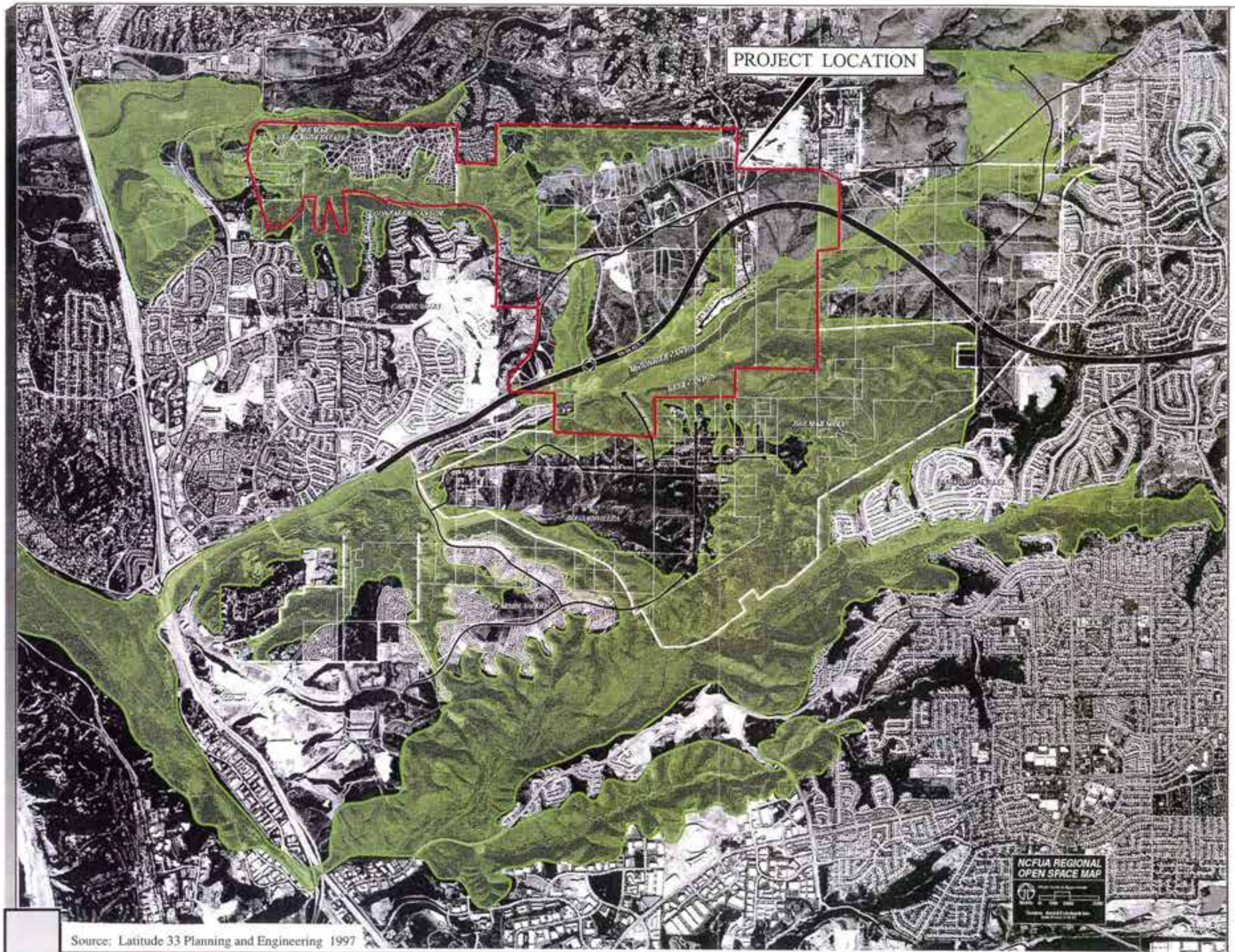
The major circulation element roads also consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor. However, the transition from Del Mar Heights Road to Carmel Valley Road would represent a more linear west to east route which generally parallels the SR-56 alignment through the site. The intersection of Del Mar Heights Road and Carmel Valley Road would be east and north of the Subarea Plan 1 location and Camino Santa Fe would become a much longer and more circuitous route south of SR-56. Access to the Town Center would be via Camino Santa Fe south of the freeway rather than from Del Mar Heights Road on the north side of SR-56, and the Camino Santa Fe/SR-56 interchange would be approximately 4,000 feet northeast of the location shown in Plan 1.

Each of the project components are described in detail below for each plan.

D. MSCP Open Space

An important component of the proposed land use plan for Pacific Highlands Ranch is the natural open space system and its relationship to the regional biological open space preserve design. As part of the approved City of San Diego MSCP, a Multiple Habitat Planning Area subarea plan has been adopted for the region, including the project area. Figure 3-4 shows the project site and its relationship to this larger regional open space system. The natural open space system for Pacific Highlands Ranch is proposed to establish a system of wildlife corridors and habitat areas consistent with the MSCP. The open space preserve shown for both of the subarea plans discussed below are generally consistent with the MHPA.

This open space design would also be consistent with the open space system described as the "Environmental Tier" in the City's adopted 1992 Framework Plan. The "Environmental Tier" was established in the Framework Plan to preserve and protect sensitive biological resources, floodways, and important topographic features (ridges, canyons, and hillsides). The open space configuration shown under the Environmental Tier, which included the placement of SR-56 along Santa Monica Ridge/McGonigle Canyon, has



MSCP Open Space

FIGURE 3-4

Regional MSCP Open Space

6200 3100 FEET 0

North

Source: Latitude 33 Planning and Engineering 1997

been superseded with the City's adoption of the MSCP and establishment of MHPA preserve boundaries for Pacific Highlands Ranch. The adopted MSCP includes Santa Monica Ridge/McGonigle Canyon as part of a large habitat block extending to Los Penasquitos Preserve, while SR-56 is shown as extending through the preserve. The natural open space described below under both subarea plans is functionally equivalent with the adopted MSCP and would exceed the acreage of open space shown in the Framework Plan's Environmental Tier and would locate much of the SR-56 alignment in the development areas north of the MHPA. The design and configuration of the MSCP preserve open space precludes the need for designing an open space system which uses the Framework Plan Environmental Tier's conceptual planning "habitat protection zones," "biological buffer zones," and "transition zones." This terminology is superseded by formal adoption of the MSCP.

Even though SR-56 is being realigned to largely eliminate impacts to the MHPA, it is important to note that the placement of SR-56 through Pacific Highlands Ranch is addressed and allowed in the adopted MSCP and that impacts to sensitive species and vegetation types are allowed as long as appropriate mitigation is provided. SR-56 is a project that is covered under the MSCP. Mitigation for the impacts associated with SR-56 is addressed in the revised EIR for SR-56

In addition to the implementation of the MHPA in Pacific Highlands Ranch, the MHPA boundary adjustment includes properties within the Carmel Valley Precise Planning Area (Neighborhoods 8A and 10) and the NCFUA Subarea V (Deer Canyon and Lorenz Parcel). These lands and their relationship to Pacific Highlands Ranch are shown in Figure 3-5. Lands would be added to the MHPA within Neighborhood 8A and acreage would be removed within Neighborhood 10. Approximately 8.1 acres of Tier II and Tier III habitats would be removed from the MHPA within Neighborhood 10 (Figure 3-6). The acreage within Neighborhood 8A (Parcels A and B) contains largely Tier I habitats. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for Carmel Valley geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. The addition of a relatively large block of mostly Tier I habitat within Carmel Valley Neighborhood 8A would result in a MHPA that would be functionally equivalent~~superior~~ to that shown in the MSCP Subarea Plan.

1) Subarea Plan 1

Subarea Plan 1 would include a total of ~~1,347~~ 1,305 acres of open space. This total would include approximately 1,2~~68~~80 acres of MHPA undisturbed open space, which is functionally equivalent with the adopted MSCP preserve design as described in the City of San Diego MSCP Subarea Plan. The remaining open space acreage consists of active

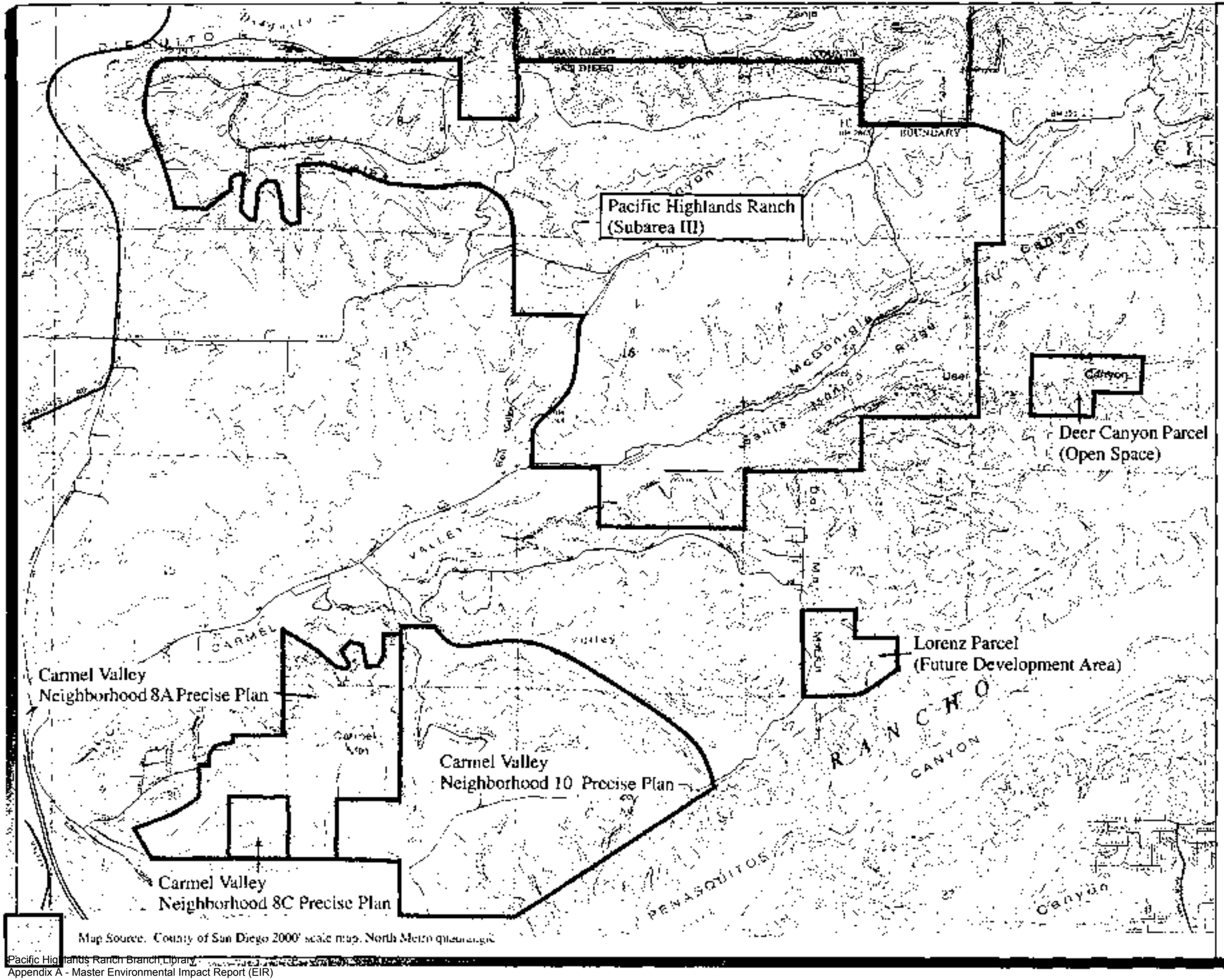
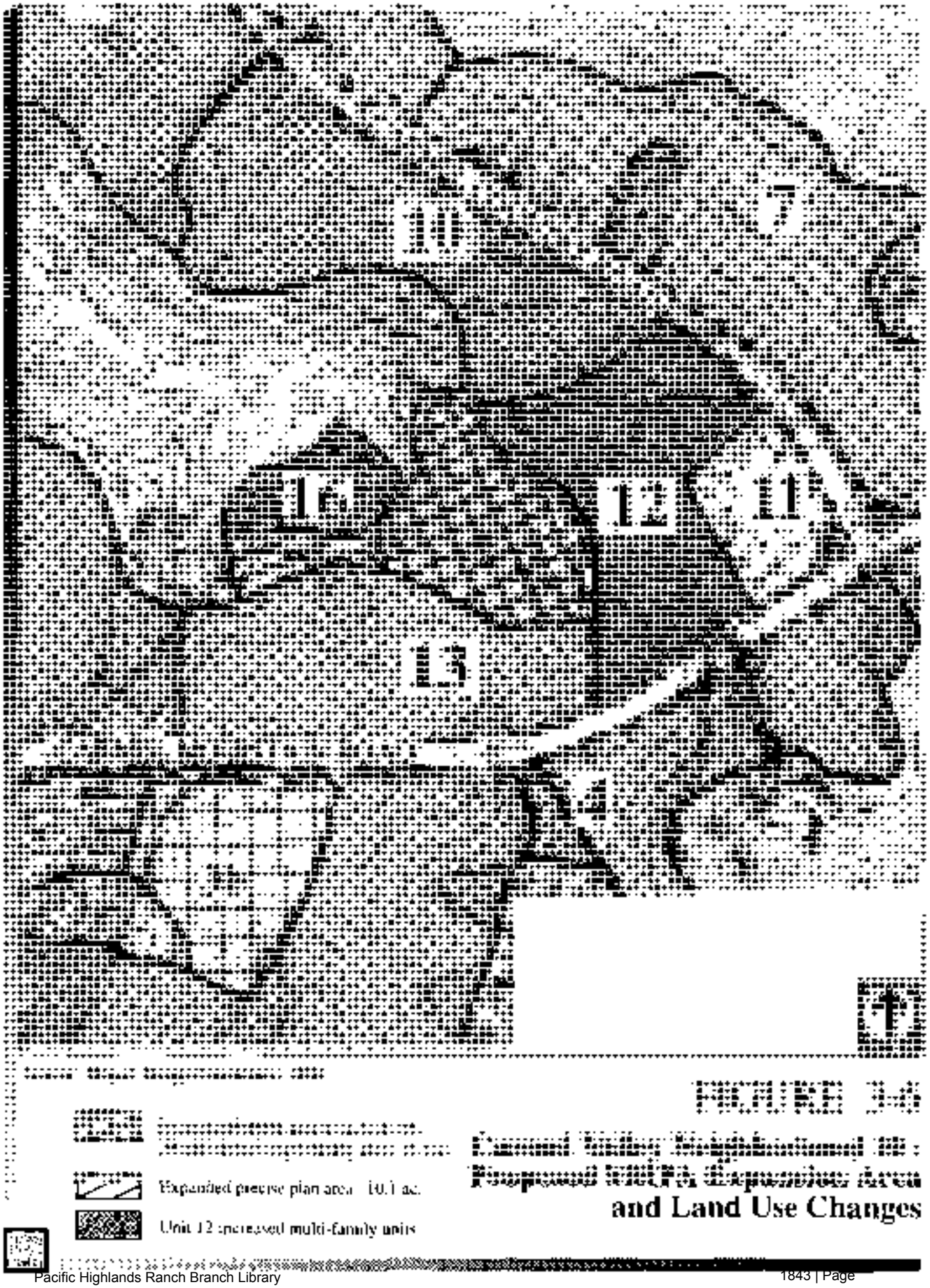


FIGURE 3-5

Proposed Project Components


Expanded precise plan area - 10.1 ac.
Unit 12 increased multi-family units
and Land Use Changes

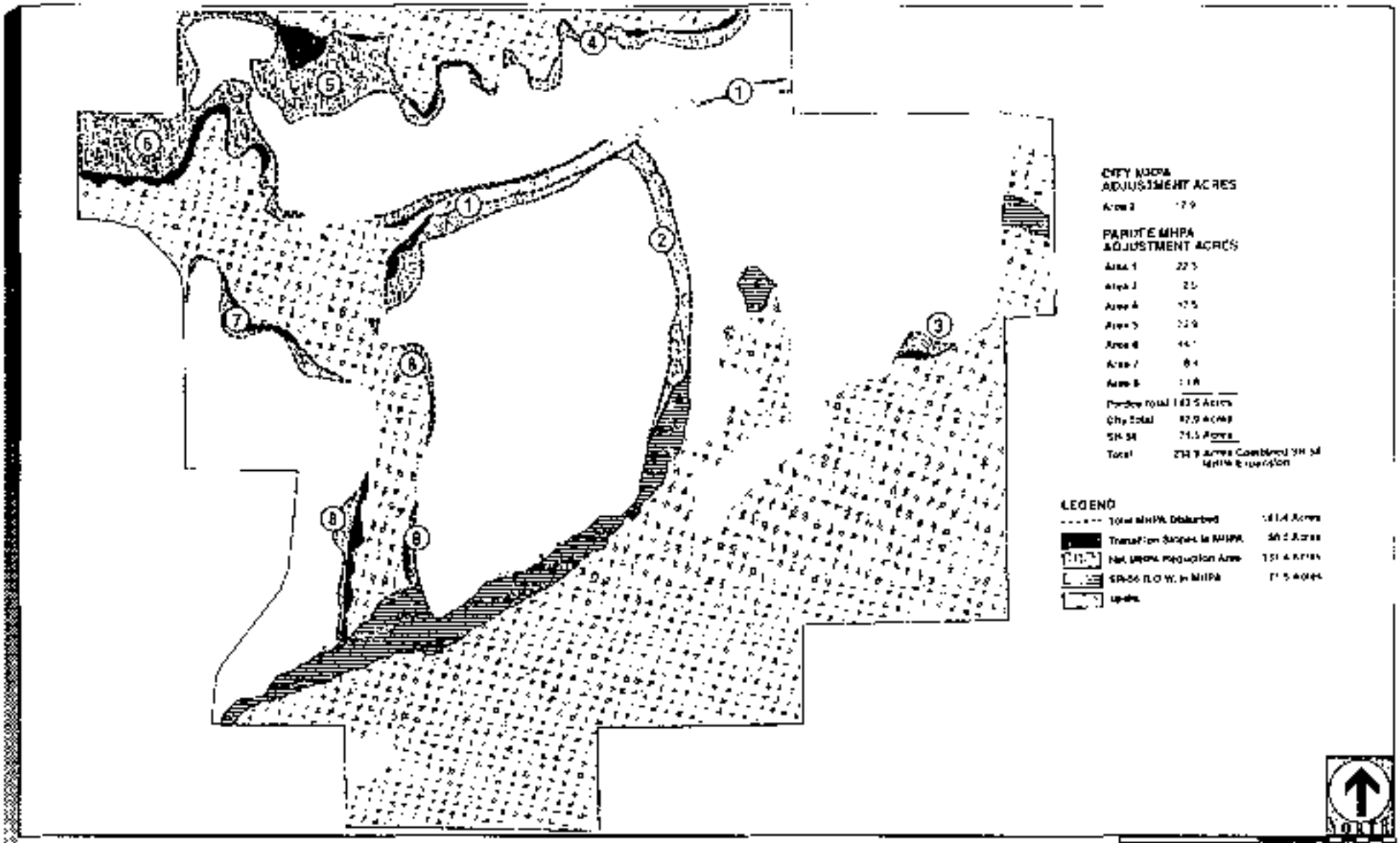
uses (e.g., parks and schools) and the urban amenity features. Figure 3-7 illustrates the boundaries of the adopted MHPA subarea preserve design and the locations where the adopted preserve design has been expanded to more precisely relate to the existing landforms.

As shown on Figure 3-7, the proposed development area for Subarea Plan 1 would be expanded into the defined MHPA open space boundary by approximately 161.6~~149.9~~ acres. Any encroachment into the MHPA associated with the SR-56 alignment is addressed in a separate EIR for SR-56. The encroachment area from the land uses shown for Plan 1 is spread across the subarea and described below:

- Both sides of the east-west urban amenity;
- Gentle slopes above McGonigle Canyon at the eastern boundary;
- North-facing slopes above La Zanja Canyon;
- East of the approved Del Mar Highland Estates subdivision and south of the existing off-site Senterra development;
- Along the edges of the north-south wildlife corridor between Gonzales and McGonigle Canyons.

The proposed expansion into the MHPA has been reviewed by all interested conservation and community planning groups. Numerous meetings and site visits were held with these groups (e.g., Sierra Club, Carmel Valley Community Planning Board, U.S. Fish and Wildlife Service, Department of Fish and Game, and the Endangered Habitats League) in 1997 and 1998 to develop a plan which accommodated regional biological conservation goals, while preserving the function of the MHPA.

The natural open space system proposed for Pacific Highlands Ranch would establish a system of wildlife corridors and habitat areas. The on-site open space system would preserve the habitats and major wildlife corridors south of SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide a desired northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. This north-south corridor is part of the regional wildlife preserve system and grading (to be revegetated) would be required to create this linkage with undercrossings beneath Del Mar Heights Road. Gonzales Canyon proceeds westerly through the Del Mar Highlands Estates PRD property and drains into the San Dieguito River valley. Undercrossings are proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement. The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also be a component of the natural open space system.



Map source: Latitude 33 Planning and Engineering 1998

Figure 3-7

MSCP Preserve Encroachment Areas
Plan 1

a) Mitigation Land Banks

In order to effectuate the boundary adjustments to the MHPA, a mitigation bank would be established over approximately 100 acres of land within the Pardee ownership in Pacific Highlands Ranch. The bank will consist of disturbed land that will be revegetated in accordance with the master revegetation plan. Restored habitats will consist of appropriate wetland and upland habitats. The City will direct project applicants needing mitigation in the North City area to purchase credits in this bank, and will accept land from this bank into the MHPA upon purchase of credits by a third party. The bank will be processed and approved expeditiously by the City in a manner that will enable establishment costs to be kept to a minimum.

For areas to be restored, a conceptual revegetation summary which outlines the general criteria and maintenance requirements to be included in a more detailed master revegetation plan for Pacific Highlands Ranch is an appendix to this EIR. Restored lands included in the mitigation bank would be maintained as required in the Master Revegetation Plan until credits are sold and the land conveyed to the City for MHPA purposes. Upon conveyance, the City would assume responsibility for management and maintenance.

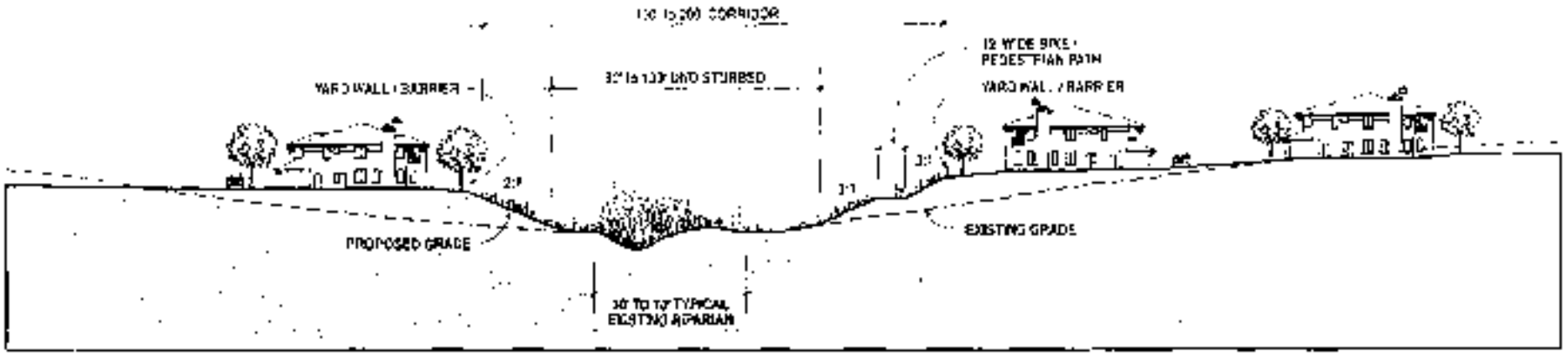
A mitigation bank covering approximately 24 acres within Parcel A of Carmel Valley Neighborhood 8A would also be established as a component of the MHPA boundary adjustment process.

b) Urban Amenity Open Space

The open space system under Subarea Plan 1 would also include approximately 20 acres of "urban amenity" open space that would be located primarily in the upper reaches of Gonzales Canyon. This east-west open space amenity area would be intended to provide visual relief, linear park with recreation benefits, and pedestrian links. The urban amenity would complement the biologically oriented expanses of the open space system by encouraging human use outside the areas where the most valuable natural resources are restored and preserved. This area would not be intended to function as part of the natural habitat system. The urban amenity does, however, protect and preserve the wetland habitat in the upper reaches of Gonzales Canyon. As shown in Figure 3-8, the proposed urban amenity corridors would provide open space links between neighborhoods, public facilities, and activity centers.

c) Neighborhood Parkway Areas

Subarea Plan 1 includes two neighborhood parkways as integral components of the community-wide system for pedestrian movement. The neighborhood parkway's would provide visual relief, recreation benefits, and pedestrian links. They would include either two lanes for automobile traffic, parking on one side, bicycle lanes abutting the traffic



Source: Latitude 3 Planning and Engineering, 1998

FIGURE 3-8

Urban Amenity Cross Section

lanes, a landscaped median, sidewalks, and 25 feet of landscaping (one side only) for benches and trails. The primary neighborhood parkway is a north-south corridor that would connect McGonigle Canyon and the MHPA open space south of SR-56 to the urban amenity and Gonzales Canyon in the north. The neighborhood parkway would be approximately 100 feet wide (see Figure 3-1). The secondary neighborhood parkway would also be approximately 100 feet wide and would connect the Village to the northern neighborhoods, the east-west urban amenity, and the MHPA open space in La Zanja Canyon. Also, this neighborhood parkway would be adjacent to the neighborhood park and elementary school north of the Town Center, and would provide future residents an alternative access route to these facilities.

The neighborhood parkways will include benches and trails and paths that connect the MHPA and the development area on the south side of SR-56 with the remainder of the subarea. SR-56 will bridge the neighborhood parkways and all other vehicle crossings will be kept to a minimum.

The primary neighborhood parkway will replace the north-south urban amenity proposed in the Framework Plan; however, it will be shifted about 800 feet east of the alignment shown in the Framework Plan. It will provide a connection between Gonzales and McGonigle Canyons.

d) Open Space Trails Systems

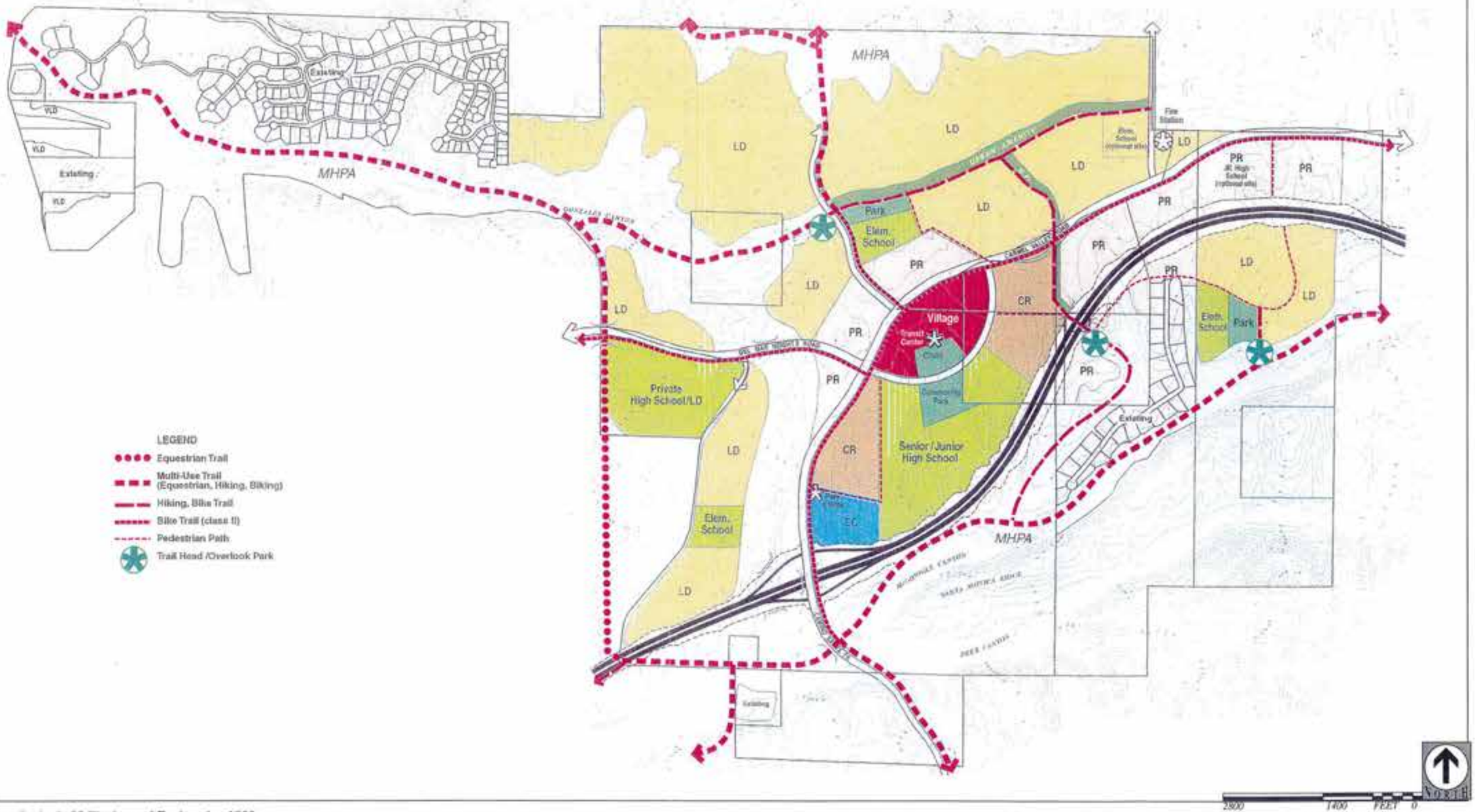
Pacific Highlands Ranch would also include a plan for an extensive system of trails within the overall open space system. The trail system would include hiking, biking, and equestrian trails that connect with existing paths within the built neighborhoods. The trails would be located within the MHPA preserve as allowed by the adopted MSCP. Figure 3-9 shows the trails plan for Plan 1.

e) Open Space Overlook (Trail Heads)

Subarea Plan 1 identifies three open space overlooks (see Figure 3-9) with educational signage and benches that will be maintained by the proposed Landscape Maintenance District.

f) MHPA Preserve Management

The proposed Subarea Plan describes the management requirements for the various components of the open space system. Pursuant to the adopted MSCP, the preserve would be dedicated to the City of San Diego and the long-term management of the preserve would be the responsibility of the City. A conceptual habitat management plan



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-9

Trails System Plan 1

will be prepared for the Pacific Highlands Ranch project and incorporated into the Subarea Plan.

2) Subarea Plan 2

As shown in Figure 3-2, the open space system shown for Subarea Plan 2 is similar to Plan 1. However, with the more northerly alignment of SR-56, the interface with the MHPA open space along the southern portion of the site along McGonigle Canyon would be replaced by residential land uses rather than the freeway corridor forming the southern limit of development. In addition, the Del Mar Heights Road crossing of the north-south open space corridor linking McGonigle Canyon with Gonzales Canyon would be northerly of the location shown in Subarea Plan 1. This corridor would also be narrowed in the southwest corner of the project site. Overall, the encroachment into the MSCP preserve would be increased from approximately 161.4~~149.9~~ acres to 230.5~~212.0~~ (gross) acres under Plan 2. The Gonzales Canyon corridor would remain unchanged from Plan 1. The primary neighborhood parkway corridor would be shifted to the west abutting the boundary of the public high school and would replace the north-south urban amenity proposed in the Framework Plan. Its alignment is shown on Figure 3-2. The secondary neighborhood parkway would also abut the neighborhood park and elementary school in the northern portion of Pacific Highlands Ranch; however, it would not be connected to the Village. This neighborhood parkway would provide a corridor to the MHPA open space areas of Gonzales Canyon to the east and La Zanja Canyon to the north. Three open space overlooks would also be included in this plan as well.

As shown on Figure 3-10, the proposed development area for Subarea Plan 2 would be expanded into the defined MHPA open space boundary by approximately 230.5~~212.0~~ acres (gross). This total encroachment area is spread across the subarea and is similar to the encroachment described above for Plan 1. The major difference is in the southern portion of the site above McGonigle Canyon as described below.

- Both sides of the east-west urban amenity;
- Gentle slopes above McGonigle Canyon at the eastern boundary;
- Gentle slopes above McGonigle Canyon in the south-central portion of the site;
- Gentle slopes above McGonigle Canyon at the western boundary;
- North-facing slopes above La Zanja Canyon;
- East of the approved Del Mar Highland Estates subdivision and south of the existing off-site Senterra development; and

Map source: Latitude 33 Planning and Engineering, 1998

Figure 3-10

MSCP Preserve Encroachment Areas
Plan 2

- Along the edges of the north-south wildlife corridor between Gonzales and McGonigle Canyons.

As with Plan 1, the natural open space system proposed under Plan 2 would also establish a system of wildlife corridors and habitat areas functionally equivalent with the MSCP. The on-site open space system would preserve the habitats and major wildlife corridors south of SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide a desired northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. Undercrossings are proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement. The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also continue to be a component of the natural open space system. Plan 2 also incorporates trails as shown in Figure 3-11.

E. Residential Element

The residential component of Pacific Highlands Ranch would consist of a variety of lot sizes and product types. The proposed densities would range from estate (0.25-1 dwelling units per acre [du/ac]) to the high density residential areas associated with the Village of the Town Center (34 du/ac).

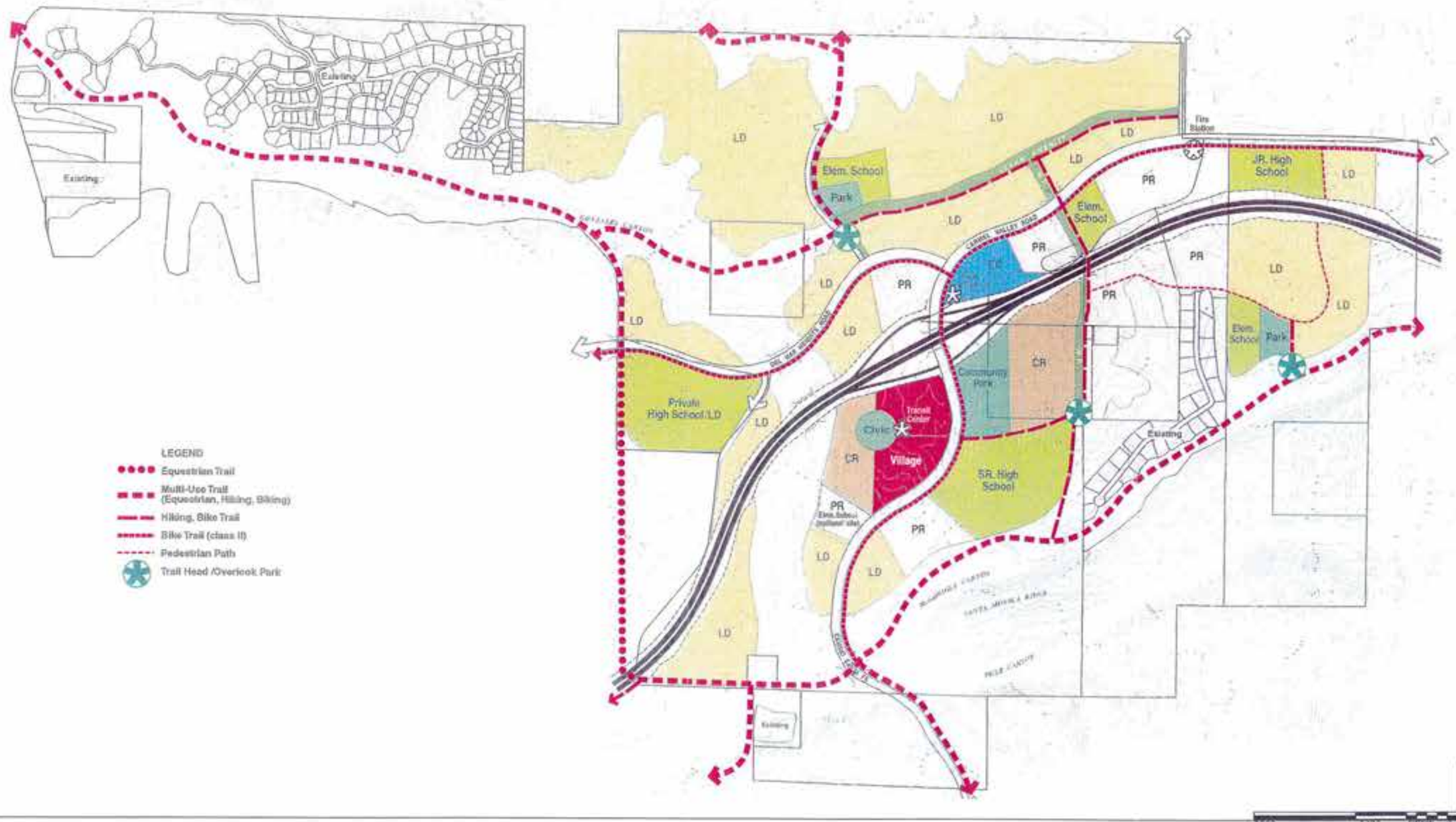
This element would also comply with the affordable housing requirements of the Framework Plan. Fulfillment of this objective may be satisfied by:

- A set aside of no less than 20 percent of the units for occupancy by, and at rates affordable to, families earning no more than 65 percent of median area income, adjusted for family size, or

- Dedicating developable land of equivalent value.

- Residential development of more than 10 dwelling units must satisfy the City's Affordable Housing requirements. This requirement could be satisfied through the provision of affordable housing.

- Residential development of 10 or fewer housing units and residential development falling within the estate and very low density residential categories may, at the discretion of the City, satisfy the affordable housing requirements by donating to the city an amount of money equivalent to the cost of achieving the required level of affordability, into an NCFUA Affordable Housing Trust Account administered by the San Diego Housing Commission



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-11

Trails System Plan 2

The breakdown of residential uses for each of the subarea plans is shown in Table 3-1. The residential design features of each of the subarea plans are described below.

1) Subarea Plan 1

Subarea Plan 1 (see Figure 3-1) would encourage a diverse mix of residential densities and product types. Approximately 4,974 new residential dwelling units would be allocated to Pacific Highlands Ranch under this land use plan. The residential units would be distributed throughout the subarea, and the proposed diversity of housing types would be intended to increase housing choice and affordability. A balanced distribution of housing types is proposed, with approximately 63.6 percent (3,161 units) of the units proposed as single-family and 36.4 percent (1,813 units) proposed as multi-family units.

The highest density of residential uses (34 du/ac) would occur within the Village of the Town Center (maximum of 500 dwelling units at build-out). The areas adjacent to the Village are shown as "core residential" (9-14 du/ac) on the land use plan and would be located adjacent to the Village area, north of SR-56 and south of Carmel Valley Road. These two densities would comprise the attached multi-family product types which total approximately 1,813 units (36.4 percent). The remainder of the residential units would consist of detached single-family units in a variety of lower densities: very low, low, and peripheral residential. The very low density (0.25-1 du/ac) residential areas would be primarily located in a non-contiguous portion of the subarea, along the western boundary of Del Mar Highlands Estates. Low density (2-5 du/ac) uses would be primarily sited north of Carmel Valley Road. "Peripheral residential" (5-9 du/ac) densities would be generally located along the SR-56 corridor and the area immediately north of the Town Center. There would also be small areas of low density, and peripheral residential which accompany the existing Rancho Glens Estates very low density development south of the SR-56 alignment. Overall, the residential densities proposed would be less intense the further away from the Town Center, but each residential component would be integrated into the plan by trails, bikeways, urban amenity open space, and streets. The trail system would accommodate walking, biking, and jogging activities and would provide access to the Town Center, civic areas, schools, and parks. The subarea plan would also include design principles which address open space, setbacks, garage siting, street patterns, and housing types and density.

2) Subarea Plan 2

Subarea Plan 2 would incrementally increase the allowed number of dwelling units up to 4,9743 new residential units, with approximately 65 percent (3,240) being single-family and 35 percent (1,7343) being multi-family. The acreages of each residential type and the corresponding maximum number of dwelling units are also provided in Table 3-1.

As shown in Figure 3-2, the more northerly alignment of SR-56 substantially would alter the residential layout under Plan 2 by narrowing the developable area between the freeway alignment and the Del Mar Heights Road/Carmel Valley Road corridor. The width between the Del Mar Heights Road/Carmel Valley Road corridor and the Gonzales Canyon urban amenity to the north would also be restricted. Because of these physical parameters, the resulting residential land use pattern in the northern portion of the subarea would generally consist of smaller and narrower residential development areas.

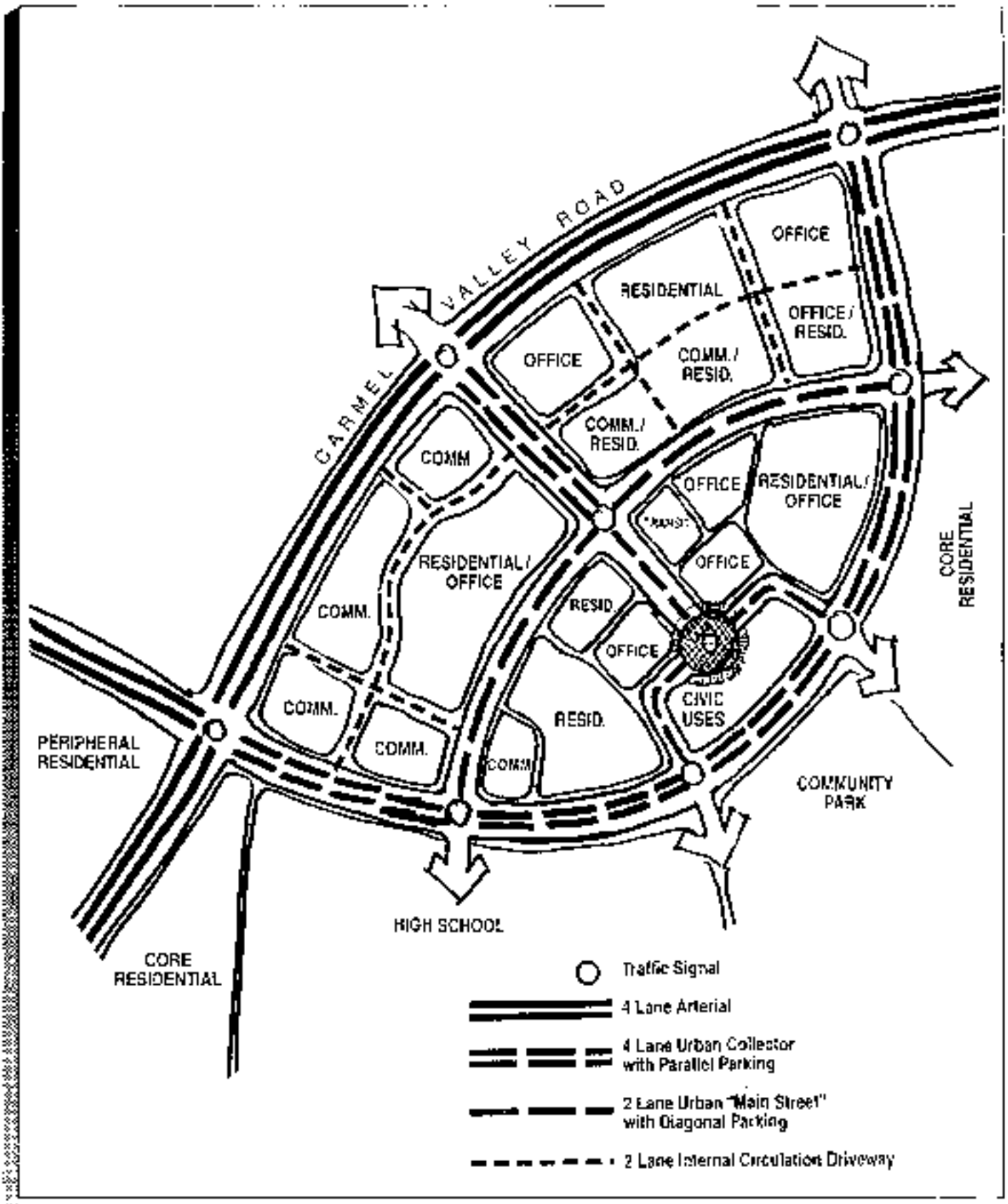
The residential uses south of the SR-56 alignment would also differ in the central portion of the subarea from Plan 1 because of the relocation of the freeway and the movement of the Town Center. The residential densities and locations are generally similar to Plan 1 at the eastern and western portions of the site. However, the low-density residential development shown at the southwestern boundary would be extended to the southern boundary under Plan 2 and access to the existing CUP would be from the west rather than from Camino Santa Fe on the east.

F. Town Center Element

The Pacific Highlands Ranch land use plan would include a Town Center, which would be generally located east of the intersection of Del Mar Heights Road and Carmel Valley Road. This land use designation would allow for a combination of commercial, office, high density residential, and public uses. The Town Center and its relationship to each of the land use plans are described below. The Town Center would be pedestrian-oriented providing retail, commercial, and employment uses for the Pacific Highlands Ranch. Within the Town Center is the Village. The Village consists of residential, commercial, and civic uses and is discussed below. Figures 3-12 and 3-13 illustrate conceptual site layouts of these uses under Plans 1 and 2, respectively.

1) Subarea Plan 1

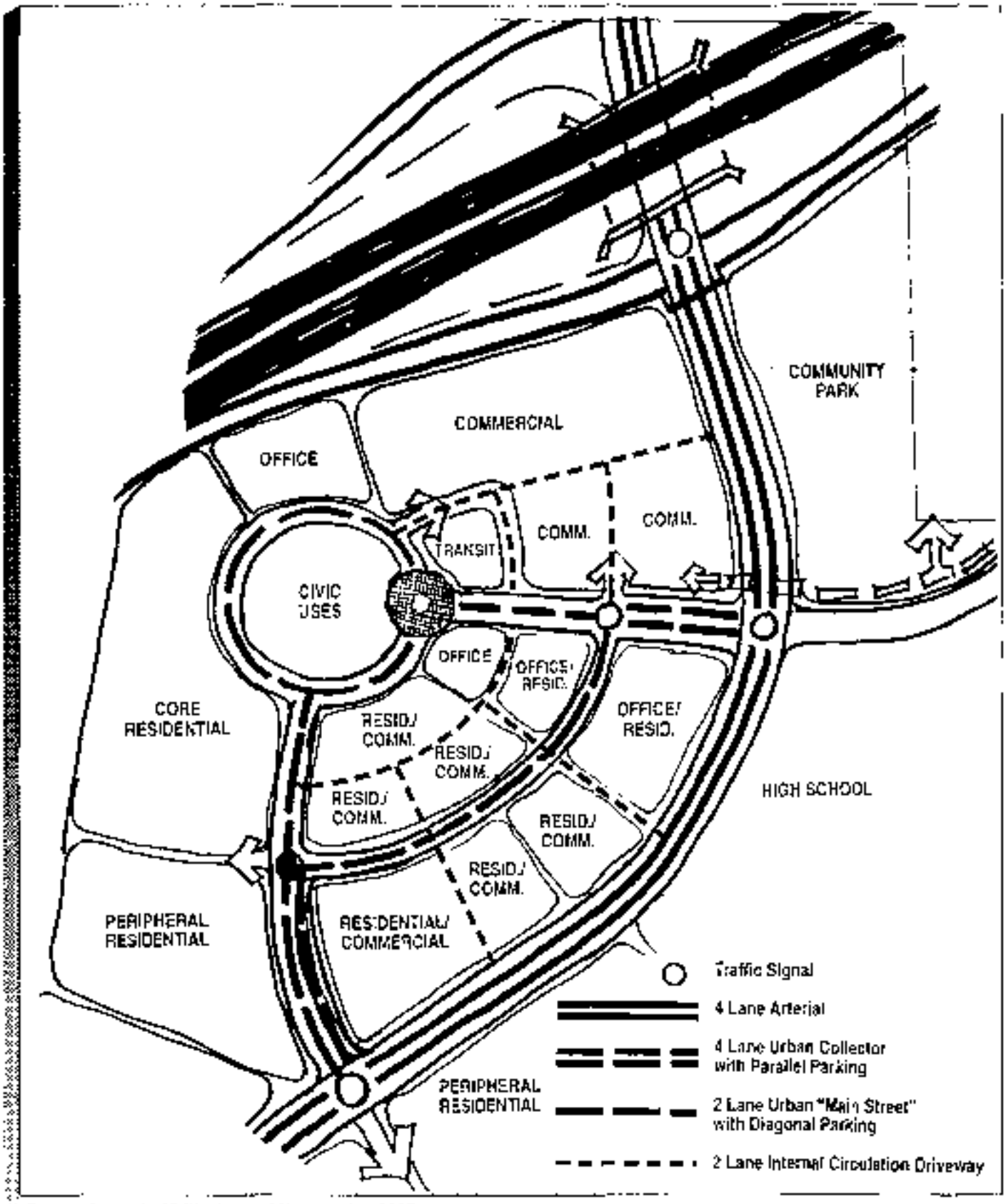
The 2~~1~~05-acre Town Center includes approximately 1,500 dwelling units, up to 300,000 square feet of retail and office space, a 50-acre senior high school, a 20-acre junior high school, a ~~20~~13-acre community park, a 65-acre civic use area, and a 200,000-square-foot employment center. As shown on Subarea Plan 1 (see Figures 3-1 and 3-12), the Village component of the Town Center would consist of approximately 150,000 square feet of commercial retail uses, 150,000 square feet of commercial office uses, 500 high density residential units, and civic use area on approximately 33 acres at the northeast quadrant of the SR-56/Camino Santa Fe interchange. The Village would be readily accessible via SR-56 and would be immediately east of the Del Mar Heights Road/Carmel Valley Road intersection and would include a transit center at the core of the area. This area also would be served by the extensive system of pedestrian and bicycle paths. A civic area



Source: Latitude 33 Planning and Engineering, 1997

FIGURE 3-12

Town Center Village, Plan 1 Land Use Concept



Source: Latitude 33 Planning and Engineering 1997

FIGURE 3-13

Town Center Village, Plan 2 Land Use Concept

(i.e., transit center, pedestrian plaza, and library) would also be proposed in the Village, and Core residential, and a 13-acre community park are adjacent to the Village. Other allowable uses within the Village would include child care centers, community centers, and churches. Design principles for the Village are would be included in the subarea plan.

Employment Center

An approximately 200,000-square-foot employment center and a park-and-ride facility would be proposed on a 20-acre site south of the Village in the Town Center, north of the SR-56/Camino Santa Fe interchange. Access to the facilities located in the Village and surrounding land uses would be provided for by the incorporation of pedestrian connections and street systems in the design of the plan.

2) Subarea Plan 2

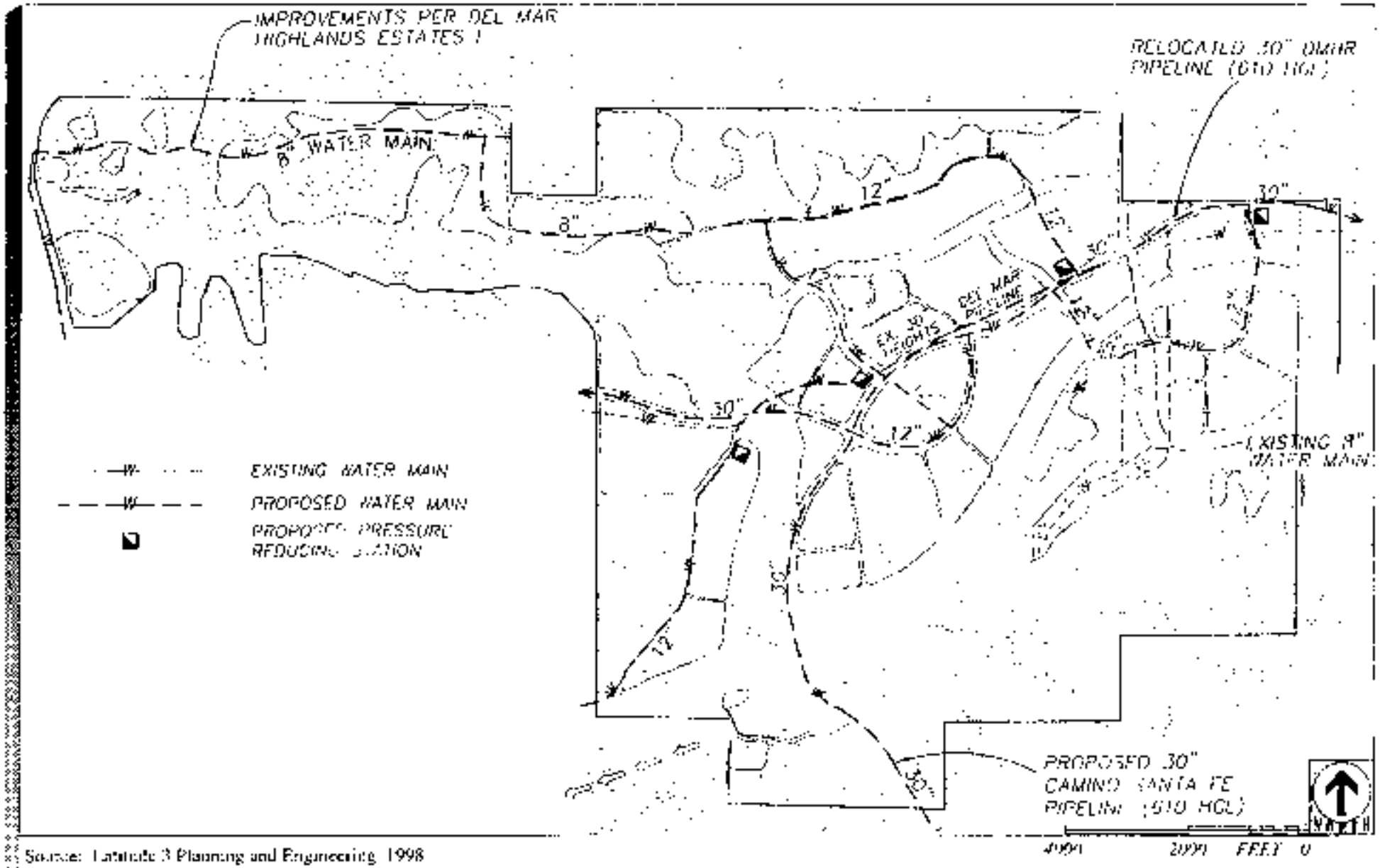
The 215-acre Town Center includes up to 300,000 square feet of retail and office, a 50-acre high school, a 20-acre community park, and a 5-acre civic use area. The acreages and square footages associated with each of the land uses would be similar to those described for Subarea Plan 1 above. However, with the northerly freeway location and shifting of the SR-56/Camino Santa Fe interchange to the east, the Town Center area would be located on the south side of the freeway (see Figure 3-2). Camino Santa Fe would border the Village on the east rather than the west and would provide access to the various uses. The 20-acre community park would be moved to the east of Camino Santa Fe and the Village and adjacent to the senior high school and the SR-56 interchange with Carmel Valley Road (see Figure 3-13).

Employment Center

The employment center under Subarea Plan 2 would not be adjacent to the Village and would be shifted to the northeast quadrant of the Camino Santa Fe/SR-56 interchange. The acreage would be 16 acres but the square footage would be similar to those described for Subarea Plan 1.

G. Community Facilities Element

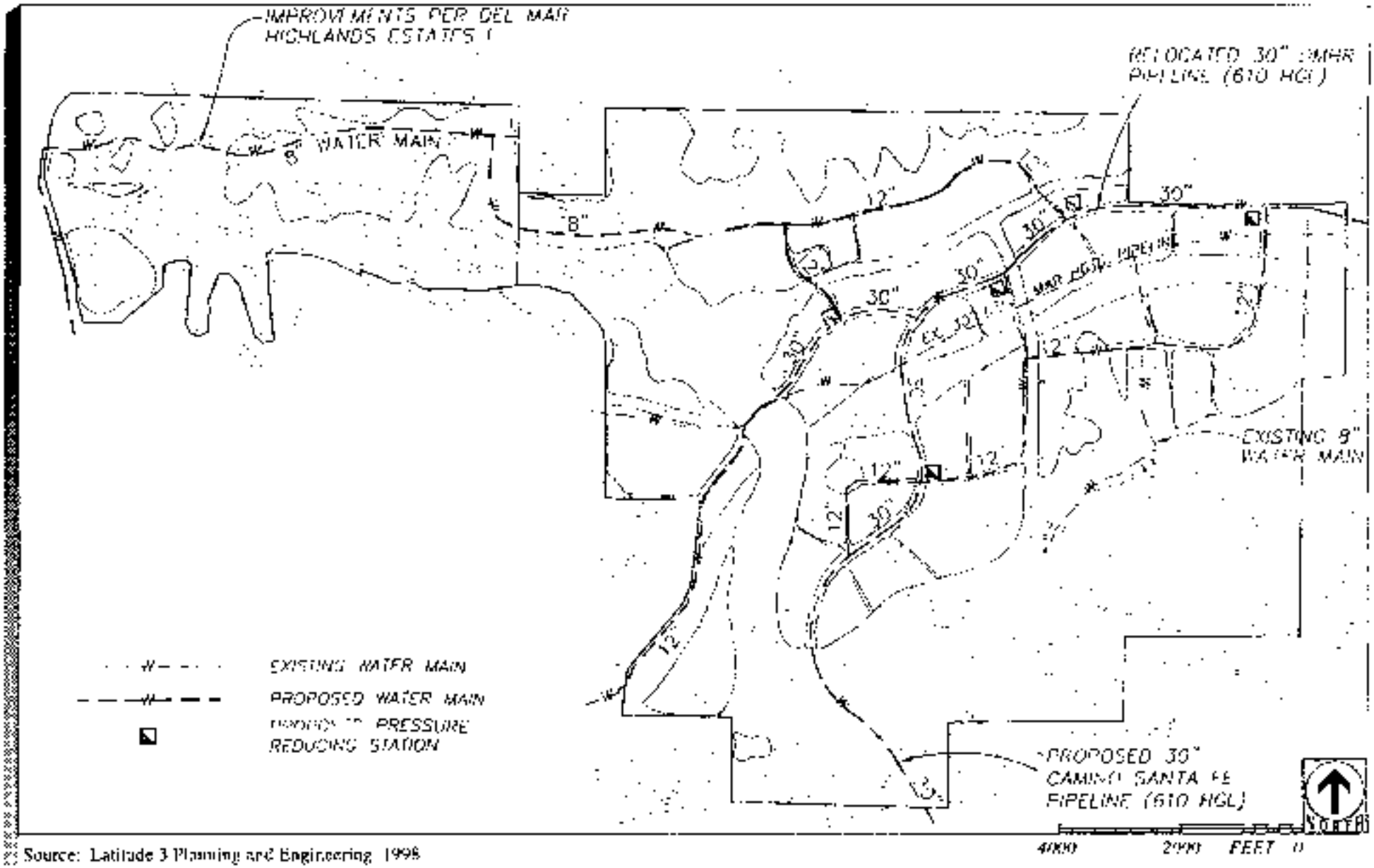
Public facilities that would be provided within Pacific Highlands Ranch include schools, a library, a fire station, water and sewer facilities, and parks. Overall, Pacific Highlands Ranch would require one community park, three elementary schools, two neighborhood parks, a junior high ~~(and an optional junior high school site)~~, a public and private high school, a public library, a fire station, and water and sewer collection mains. Figures 3-14 through 3-17 illustrate the proposed alignments for water transmission and sewer



Source: Latitude 3 Planning and Engineering, 1998

FIGURE 3-14

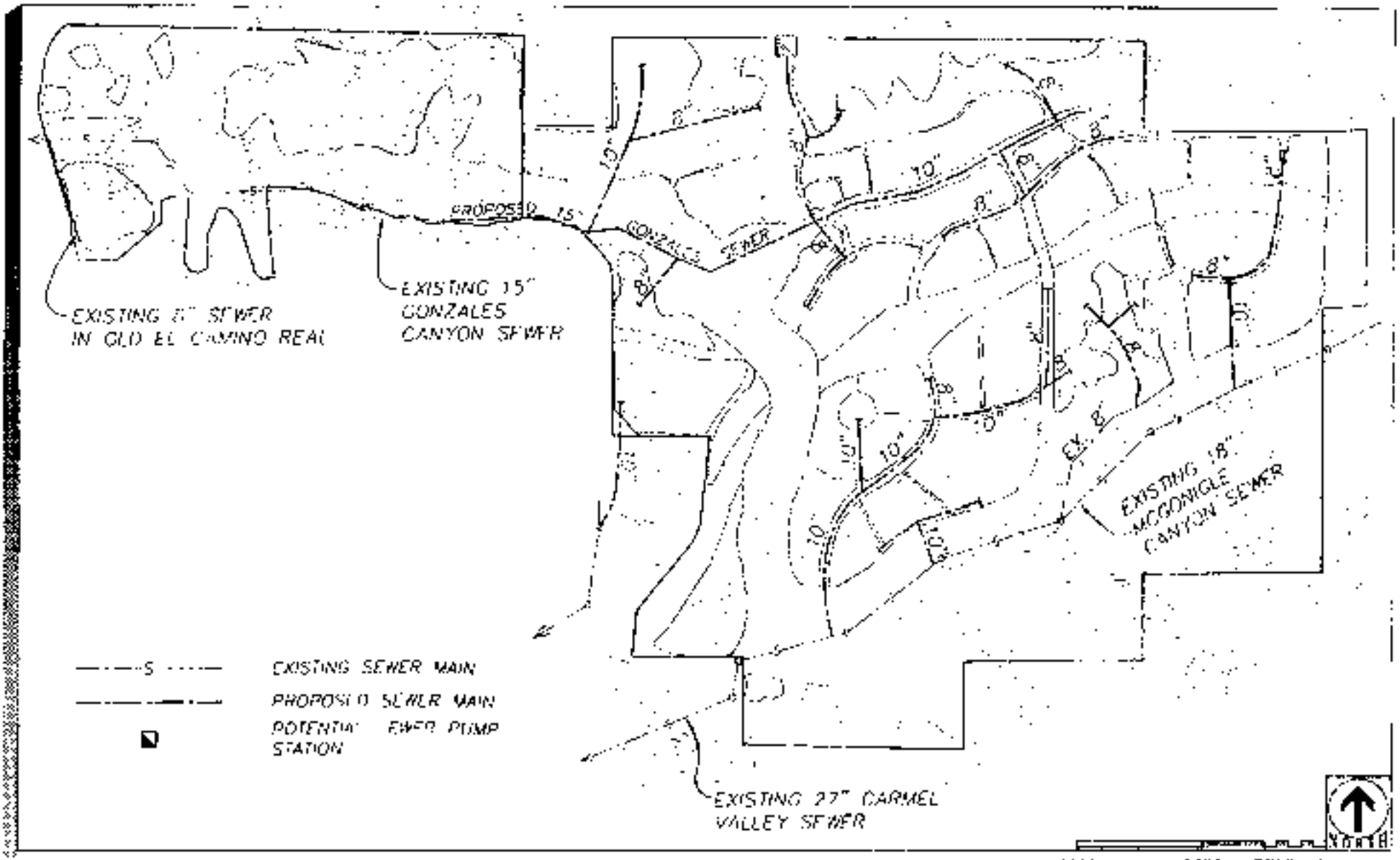
Conceptual Water Transmission Mains - Plan 1



Source: Latitude 3 Planning and Engineering 1998

FIGURE 3-15

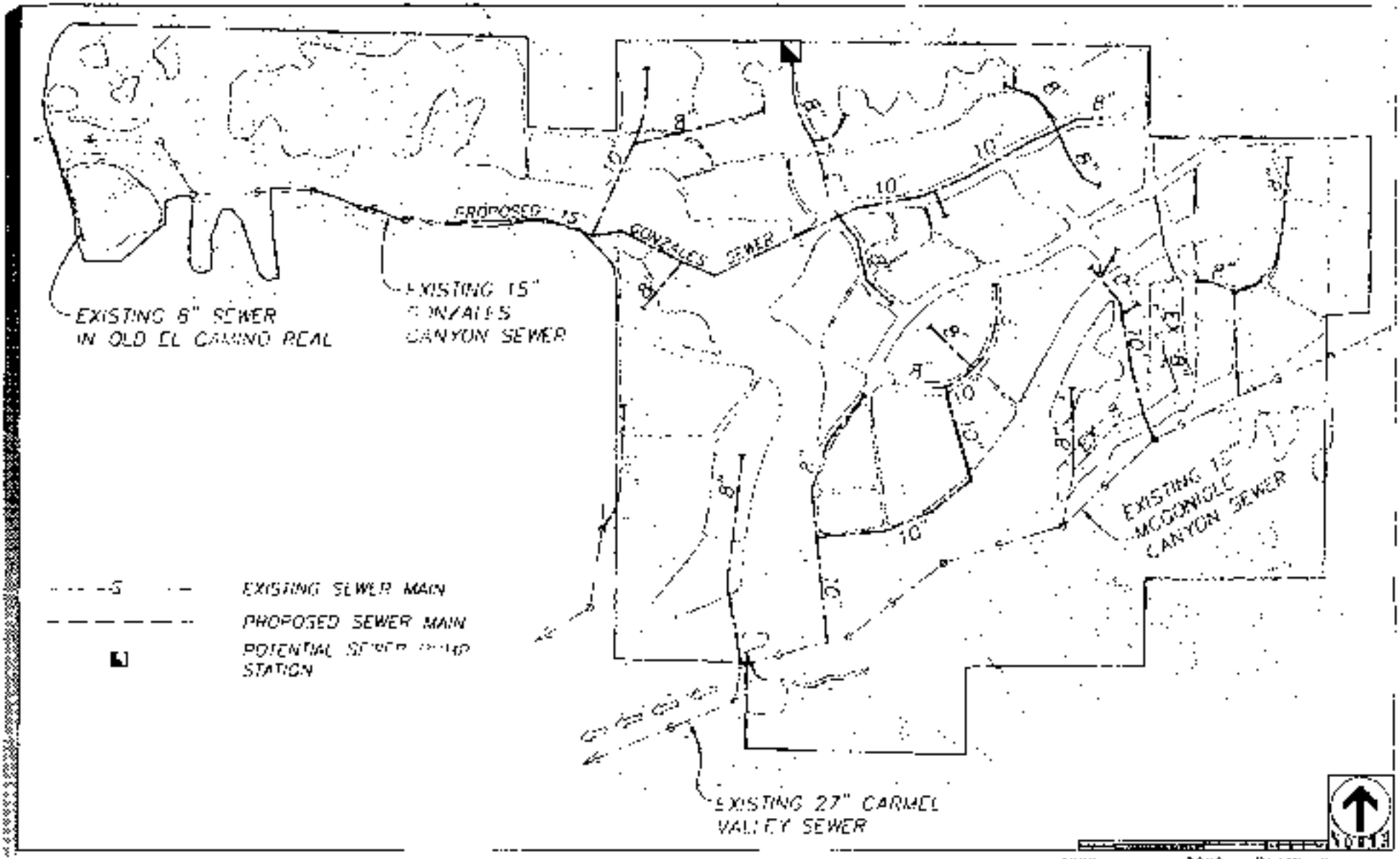
Conceptual Water Transmission Mains - Plan 2



Source: Latitude 3 Planning and Engineering, 1998

FIGURE 3-17

Conceptual Major Sewer Facilities - Plan 2



Source: Latitude 3 Planning and Engineering 1995

FIGURE 3-16

Conceptual Major Sewer Facilities - Plan I

collection mains for both land use plans. As described above, some of these public facilities would be sited within the Town Center and Village. Other community facilities would be located throughout the subarea and are described below for each of the subarea plans.

1) Subarea Plan 1

As shown in Figure 3-1, Subarea Plan 1 would include two 5-acre neighborhood parks, a 5-acre civic use area, and a 13-acre community park. Two of the elementary schools would be located adjacent to neighborhood parks while the third elementary school would be a stand-alone facility. One of the neighborhood parks would be proposed in the central portion of the subarea northwest of Carmel Valley Road near the urban amenity open space, with the other near the eastern subarea boundary and south of SR-56. The 13-acre community park would be sited adjacent to the senior and junior high schools and would be integrated as part of the overall core concept. Uses associated with the community park could include athletic fields, multipurpose courts, picnic facilities, trail and bikeway connections, play areas, and recreation buildings. The 5-acre civic use area would be located in the Village and would include the public library, community meeting room, and the area would be used for civic activities and open-air public gatherings. The civic use area would be connected with the rest of Pacific Highlands Ranch by trails and mass transportation.

Three elementary schools would be sited in cooperation with the Del Mar Union Elementary and Solana Beach Elementary School Districts. The elementary school sites conform to the Progress Guide and General Plan standard of 10 net usable acres. The land use plan would also include a 50-acre public high school site south of the Village, and a 20-acre junior high school, both of which would serve the San Dieguito Union High School District. A private high school and church on the Catholic Diocese of San Diego ownership, encompassing approximately 54 acres at the western boundary south of Del Mar Heights Road, would also be part of Subarea Plan 1. This high school campus would have a student population of approximately 2,200 students.

Subarea Plan 1 would also include a library site as part of the 5-acre civic use area, which exceeds the General Plan requirements. This site would accommodate the library facility. The library facility would be sited with other civic uses within the Village.

A 3.0-acre double fire station (includes a wildfire unit) would be sited in the northeastern portion of the proposed Pacific Highlands Ranch in a neighborhood of low-density residences (see Figure 3-1). The fire station would serve the entire subarea and would allow for the achievement of the City of San Diego's average response time goals.

2) Subarea Plan 2

Development of the subarea under Subarea Plan 2 would require similar public facilities, but as with the other components of the land use plan, the SR-56 alignment would modify the location of these uses. As shown in Figure 3-2, the western elementary school/neighborhood park location would move to the north side of the east-west urban amenity in the northern portion of the subarea. The eastern elementary school/neighborhood park would not be relocated. The 20-acre community park would be sited outside of the Village adjacent to the high school and south of SR-56. The civic use area (library and meeting rooms) would continue to be a component of the Village south of the freeway.

H. Circulation Element

The major arterial circulation system within Pacific Highlands Ranch would consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and State Route 56. The alignment and configuration of each of the arterial facilities would generally be consistent with the adopted Framework Plan. However, the Framework Plan alignment for SR-56 is southerly from the two alignments addressed in this EIR. This other alignment, referred to as the central alignment, is addressed as an alternative to the proposed project in Chapter 6 and is described in detail as part of the SR-56 EIR. With the movement of SR-56 into the development area, the precise alignments of the major on-site arterials have been refined in the subarea plans. As proposed in the subarea plans, both Carmel Valley Road and Del Mar Heights Road would be constructed as six-lane major arterials. Camino Santa Fe would extend southerly from SR-56 as a four-lane arterial. As proposed by the City, SR-56 would be a six-lane freeway with one interchange within Pacific Highlands Ranch.

The circulation system for Pacific Highlands Ranch is based upon one interchange at Camino Santa Fe, and has been thoroughly reviewed and approved by the City Engineer. However, the development of an additional interchange along SR-56 is not precluded, but will result in necessary plan amendments to accommodate changes in the land use plan.

The precise alignment of the freeway alignments and other project area roadways are described for each land use plan below. It should be noted that another northerly alignment is included in the revised EIR for SR-56 (City of San Diego 1998). This alignment, described as the northern alignment, is similar to the "F" alignment associated with Subarea Plan I. As such, any modifications to the proposed land use in plan 1 for Subarea III to accommodate this "northern" alignment would be within the range of alternatives addressed in the EIR, the two EIRs prepared for SR-56, and the NCFUA Framework Plan EIR.

1) Subarea Plan 1

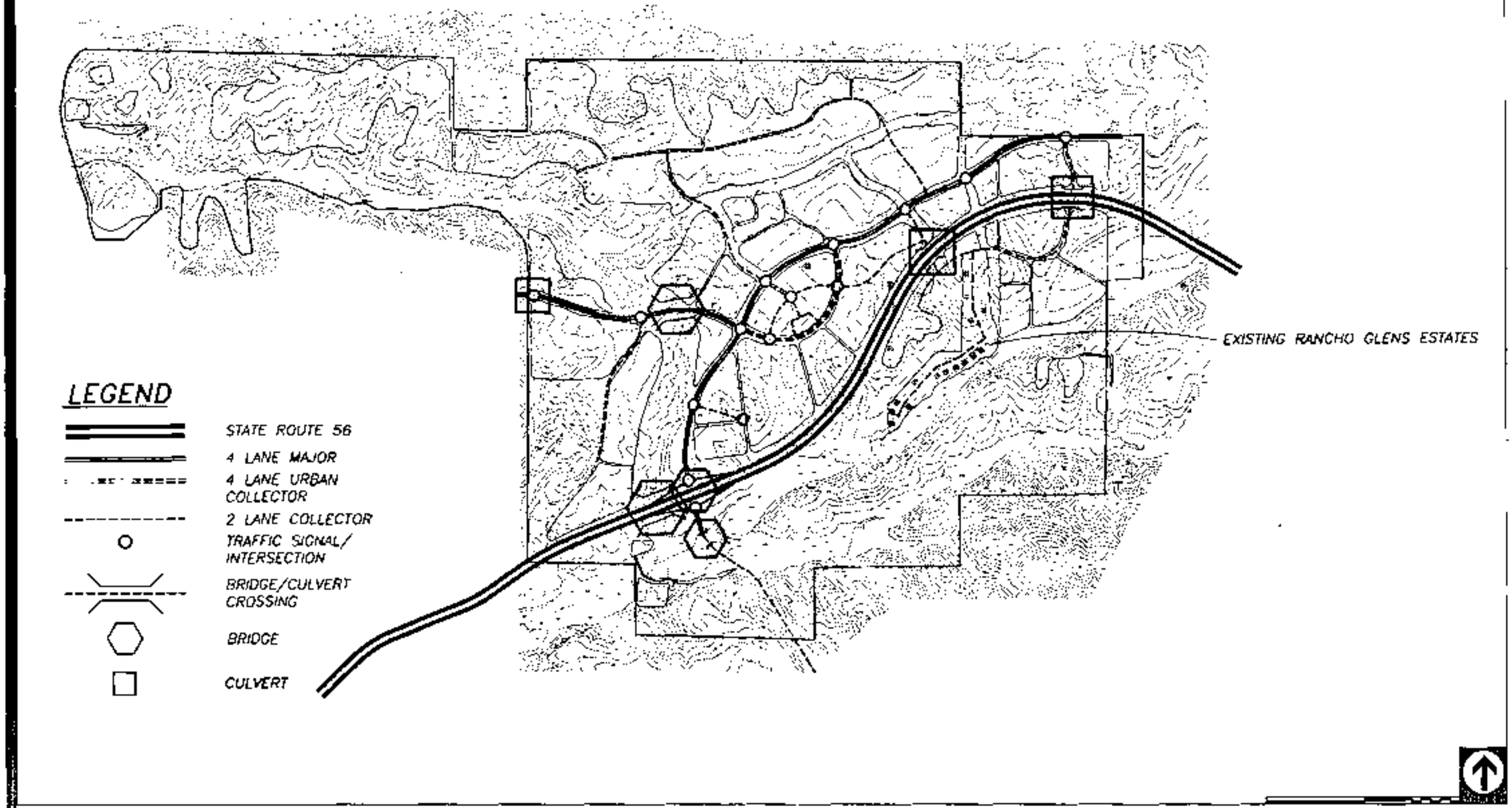
As shown in Figure 3-18, Del Mar Heights Road would enter Pacific Highlands Ranch from the Carmel Valley community and terminate at its intersection with Carmel Valley Road. Del Mar Heights Road is designated in the General Plan and the Framework Plan for ultimate improvement in its current location as a six-lane major arterial with a 120-foot right-of-way. Subarea Plan 1 would be consistent with this designation and alignment. In order to facilitate wildlife movement, a bridge on Del Mar Heights Road would be proposed over the north-south MSCP open space corridor just west of its intersection with Carmel Valley Road.

Carmel Valley Road would be extended northeasterly from its intersection with Del Mar Heights Road to the eastern boundary of the subarea. This alignment roughly parallels the SR-56 alignment shown in Subarea Plan 1. Carmel Valley Road would extend southerly to Camino Santa Fe at SR-56. Camino Santa Fe proceeds to the southern boundary of the subarea. As with Del Mar Heights Road, a bridge would be provided on Camino Santa Fe south of SR-56 to allow east-west wildlife movement within the MSCP corridor along the southern boundary of the subarea.

SR-56 shown for Subarea Plan 1 represents "Alignment F" as presented in the draft EIR for the middle segment of SR-56 currently being prepared by the City. SR-56 crosses the entire NCFUA (see Figure 3-3) in an east-west direction, connecting Interstate 5 and Interstate 15. The easternmost and westernmost segments of SR-56 (2.3 and 1.8 miles long, respectively) are located outside of the NCFUA and already have been completed. Beginning at the western subarea boundary, this alignment primarily traverses disturbed agricultural land and proceeds northeasterly, north of the existing Rancho Glens Estates subdivision, and then easterly to the eastern project boundary. An interchange is proposed at Camino Santa Fe.

In addition to the major roadways within Pacific Highlands Ranch, Plan 1 would propose several connector streets to provide local circulation within the subarea, connecting the Village with residential areas and public facilities. These local connector streets would be intended to carry moderate levels of local traffic and would include bicycle lanes and pedestrian paths. The connector system would be designed to discourage through traffic between the major arterials in Pacific Highlands Ranch.

Within the Village, the local and collector streets would accommodate larger numbers of pedestrians, slow automobile traffic, promote use of mass transit, and provide on-street parking. The Village would be the center of the mass transit system in Pacific Highlands Ranch. From this central transit stop, transit routes would continue along Del Mar Heights Road and Carmel Valley Road and would connect with the transit route along



Source. Latitude 33 Planning and Engineering 1997

FIGURE 3-18
Subarea Plan 1 Circulatin System (SR-56 Alignment F)

SR-56. Additional transit stops would be located along the routes and would be sited adjacent to public facilities wherever possible.

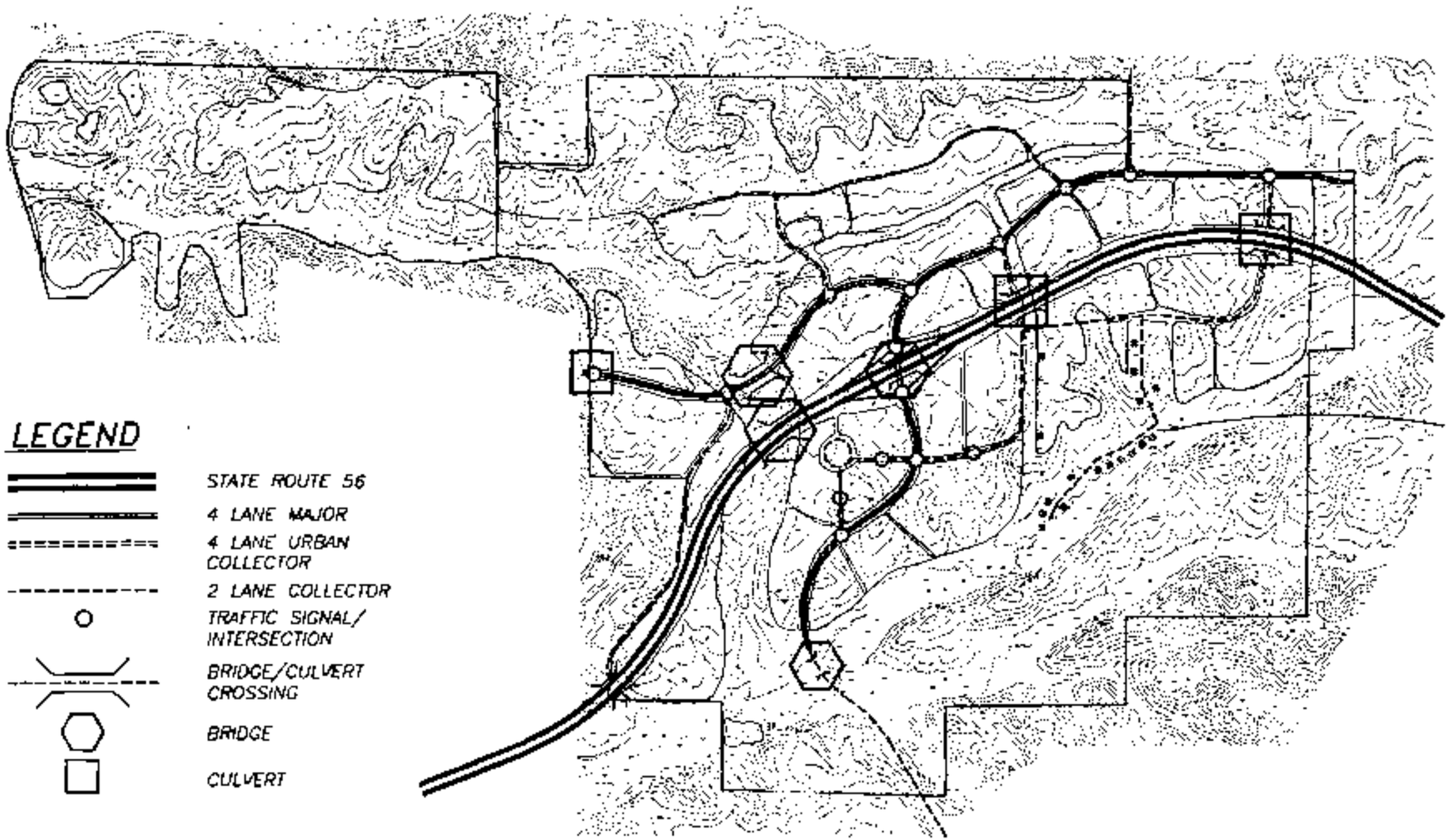
Subarea Plan 1 would also provide a system of bicycle, pedestrian, and equestrian routes (see Figure 3-9). The pedestrian and bicycle routes would connect the Village, public parks, and residential areas. The bikeways would also connect with the city-wide bikeway system. Equestrian trails would be provided within the MSCP open space which would provide linkages to the existing off-site trail systems to the north and south of Pacific Highlands Ranch.

2) Subarea Plan 2

As shown in Figure 3-19, the basic circulation components required in the Framework Plan would also be incorporated into Plan 2 with the more northerly alignment of SR-56 (Alignment "D"). The major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor. However, Alignment "D" would traverse Pacific Highlands Ranch in a diagonal manner and alter the backbone circulation system proposed under Plan 1.

Specifically, the transition from Del Mar Heights Road to Carmel Valley Road would be more linear from east to west and would roughly parallel SR-56 approximately 800 feet north of the freeway alignment. This east-west roadway through the subarea would be north of the Plan 1 location, as Del Mar Heights Road would trend northeasterly rather that southeasterly to the intersection with Carmel Valley Road. The intersection of Del Mar Heights Road and Carmel Valley Road would be approximately 2,400 feet east and approximately 3,000 feet north of the Subarea Plan 1 location. With this change the Camino Santa Fe/SR-56 interchange would also be north and east of the Plan 1 location.

In addition to the major roadways within Pacific Highlands Ranch, Plan 2 would propose a different pattern of connector streets to provide local circulation within the subarea, connecting the Village with residential areas and public facilities south of the SR-56 alignment. These local connector streets would also be designed to carry moderate levels of local traffic and would include bicycle lanes and pedestrian paths. Subarea Plan 2 would also provide a system of bicycle, pedestrian, and equestrian routes (see Figure 3-11). The pedestrian and bicycle routes would connect the Village, public parks, and residential areas. The bikeways would also connect with the city-wide bikeway system. Equestrian trails would be provided within the MSCP open space and would provide linkages to the off-site trail systems that exist to the north and south of Pacific Highlands Ranch.



Source: Latitude 33 Planning and Engineering 1997

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FIGURE 3-19

Subarea Plan 2 Circulation System (SR-56 Alignment D)

I. Implementation and Phasing

The Pacific Highlands Ranch Plan would be implemented through the proposed phase shift, General Plan/Framework Plan amendment, Development Agreement, master rezoning, and the processing of future specific development proposals within subarea NCFUA. The Pacific Highlands Ranch Plan would describe these processes and provide a detailed design guideline for each of the proposed zone designations in the subarea. The proposed design principles are cited in this EIR as part of the recommended mitigation measures.

J. Anticipated Future Projects

It is the intent of this MEIR to streamline future environmental review of subsequent development (tentative maps) by analyzing the potential impacts of the Pacific Highlands Ranch Plan at a level that will be sufficient for future projects where possible and to provide a framework for future impact analysis and mitigation consistent with this MEIR. Anticipated approvals needed to implement the Pacific Highland Ranch project would include tentative subdivision maps for the 1,665-acre Pardee Construction Company ownership, a conditional use permit for a private high school and parish church on the 54-acre Catholic ~~Diocese~~Church ownership, development plans for the designated elementary school and high school sites by the affected school districts, and tentative subdivision maps for the several other ownerships within the subarea.

At the time a future project is submitted, the City will prepare an Initial Study to determine whether the project may cause any significant impact that was not examined in this MEIR and whether the project was described as being within the scope of the Pacific Highlands Ranch Plan. If it is determined that the subsequent project will have no additional significant impacts and no new or additional mitigation measures or alternatives are required, then written findings can be made based on the Initial Study and no new environmental document will be required. If the Initial Study findings cannot be made, then either a Mitigated Negative Declaration or Focused EIR will be required as specified in CEQA Sections 21157.5 and 21158. Use of this MEIR is further limited in accordance with CEQA Section 21157.6.

This MEIR also analyzes the discretionary actions needed for the future actions (i.e., community plan and precise plan amendments, tentative map revisions, rezonings, planned development permits, etc.) associated with the Precise Plan for Carmel Valley Neighborhood 10. The environmental impacts associated with those revisions are addressed in the biology, traffic, and landform alteration sections of this MEIR. All other potential impacts are insignificant. The EIRs previously prepared for Carmel Valley Neighborhood 10 are incorporated herein by reference. Additional environmental action or consideration associated with revisions to Neighborhood 10 necessary to implement

the future discretionary actions described in the contemplated Development Agreement would not be necessary.

K. Discretionary Approvals Required

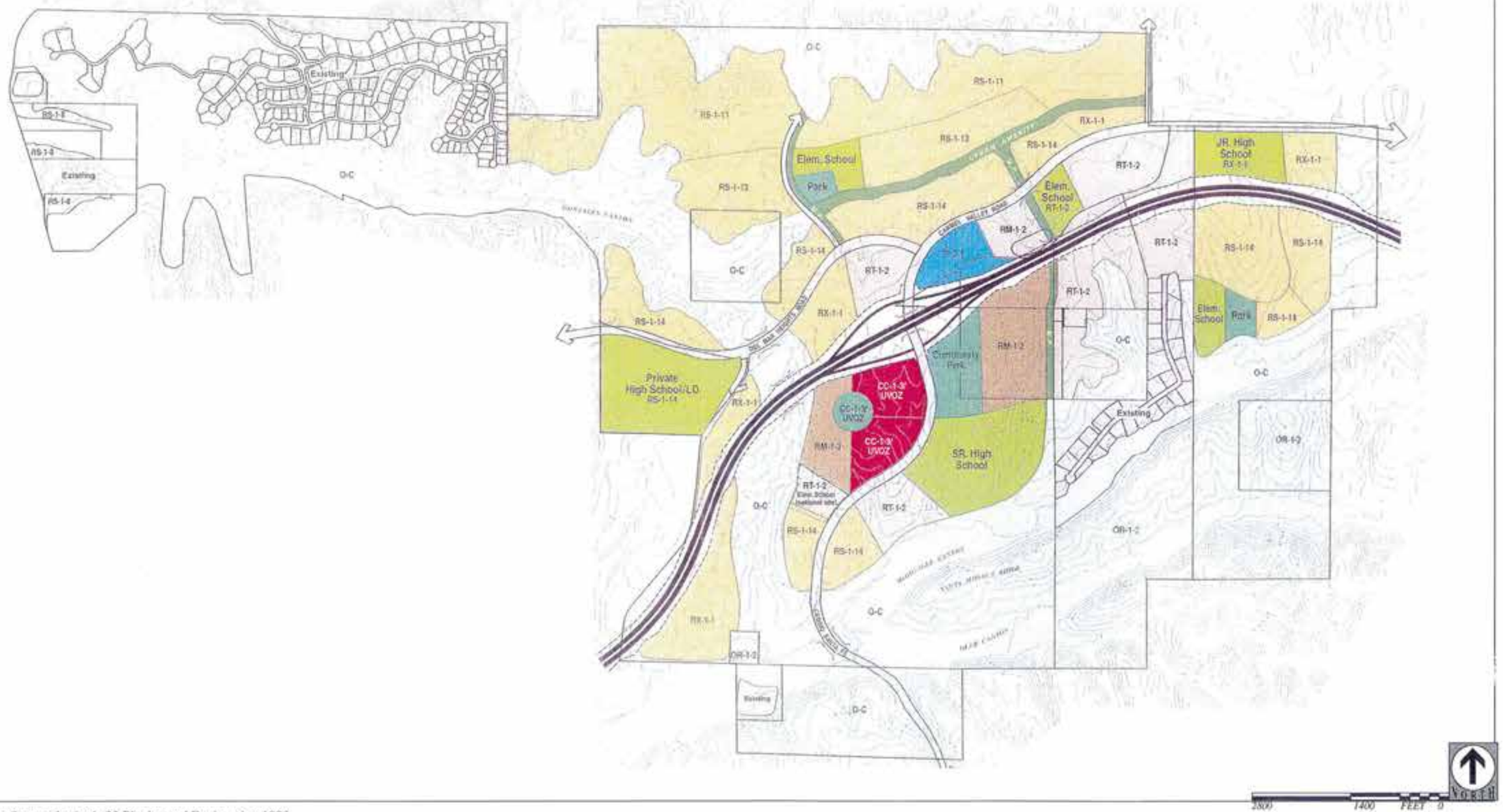
Discretionary approvals required by the City of San Diego for Pacific Highlands Ranch would include a General Plan Amendment and NCFUA Framework Plan Amendment, adoption of the subarea plan, master rezoning, a North City Local Coastal Plan Amendment, MSCP Subarea Plan Amendment and MHPA boundary adjustment, and conferring Third Party Beneficiary status. In addition to City Council approval of the GPA and phase shift in conjunction with Pacific Highlands Ranch Plan approval, the GPA and phase shift must be approved by a majority vote of the city's electorate in a general election. Each of the necessary approvals by the City Council and approvals/permits that may be required from other agencies are discussed below:

General Plan Amendment/NCFUA Framework Plan Amendment: An amendment to the adopted General Plan/NCFUA Framework Plan is required to reflect the refinements to the subarea boundary, land uses (location, acreage, and residential densities), Environmental Tier size and configuration, and circulation pattern (e.g., State Route 56 alignment) proposed in the subarea plan.

Pacific Highlands Ranch Subarea Plan Approval: This action includes adoption of a land use plan proposed in the subarea plan and the approval of a Public Facilities Financing Plan (PFFP). The PFFP identifies the funding mechanisms and timing for the construction of the necessary public facilities within the subarea. These facilities may include arterial roadways, bridges, transit facilities, libraries, parks, police and fire stations, and drainage facilities.

Master Rezoning: The existing zoning within Pacific Highlands Ranch consists almost entirely of agricultural zoning (A-1-10). The proposed master rezoning for the subarea is shown in Figures 3-20 (Plan 1) and 3-21 (Plan 2). These zones would become effective with voter approval of a phase shift.

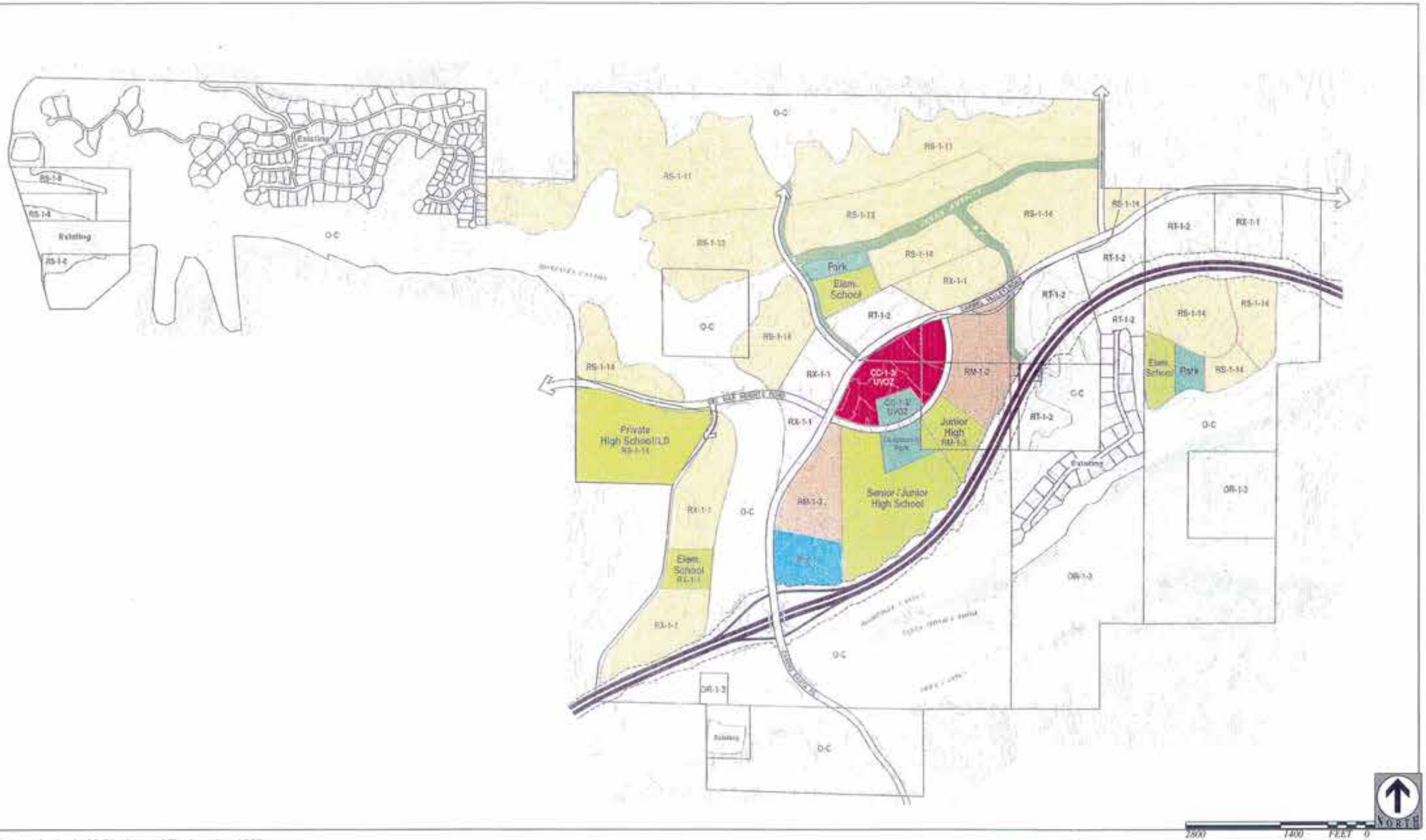
MHPA Boundary Adjustment: This action would amend the City's MHPA to include the sensitive habitats located in Neighborhood 8A and Subarea V (Deer Canyon and Lorenz Parcels as shown in Figure 3-5) of the NCFUA while removing other less sensitive areas within Pacific Highlands Ranch (approximately 150 acres) and Carmel Valley Neighborhood 10 (approximately 8.44 acres) from the preserve system. The Third Party Beneficiary Status already granted for Neighborhood 10 with the City's approval of the MSCP Subarea Plan will remain and would include the 8.44-acre boundary adjustment. Concurrence by the wildlife agencies is required for the MHPA boundary



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-21

Master Rezoning Subarea Plan 2



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 3-20

Master Rezoning Subarea Plan 1

adjustment. In addition, Third Party Beneficiary Status would be conferred to allow development in sensitive resources.

The boundary adjustment components include the conveyance of high-quality habitat in Carmel Valley Neighborhood 8A and Subarea V (Deer Canyon and Lorenz Parcel) by Pardee to the City, and an adjustment of the MHPA line to increase the size of the preserve within the Neighborhood 8A area. The MHPA would also be adjusted to delete largely disturbed habitat from the Pacific Highlands Ranch Subarea and Carmel Valley Neighborhood 10. The effect of these revisions to the MHPA would be to increase the preservation of very rare Tier I resources while allowing development on less sensitive disturbed and natural areas within Pacific Highlands Ranch and Neighborhood 10. Thus, the proposed MHPA boundary adjustment under the proposed subarea plan is considered equivalent~~superior~~ in biological value to the adopted MHPA. No further action by the City or wildlife agencies is required.

At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 150 acres would be conveyed by Pardee, of which 55 acres of Tier I habitat would be added to the MHPA. An additional 20 acres within Parcel A may be added to the MHPA in the future should the City decide not to use this acreage for school/park uses. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term.

North City Local Coastal Program (LCP) Amendment: The portion of Pacific Highlands Ranch within the coastal zone is under the jurisdiction of the California Coastal Commission. An amendment to the adopted LCP would be required to bring the LCP land use plan into conformance with the adopted subarea plan.

Development Agreement~~Future Discretionary Actions~~: A Development Agreement ~~is contemplated~~ is proposed which includes the components described above for the MHPA boundary adjustment. In addition to the boundary adjustment components, the ~~contemplated~~ Development Agreement would include the following:

- In order to implement the above-described MHPA boundary adjustments, revisions to the Carmel Valley Neighborhood 10 Precise Plan would be necessary. These revisions include an expansion of residential development (22 single-family units) on approximately 81 acres (see Figure 3-6) in to the MHPA (Precise Plan Unit 10) and an increase in the number of multi-family units from 98 to 250 (Precise Plan Unit 10). The revisions to the Neighborhood 10 Precise Plan, tentative maps, and rezonings would be implemented subsequently by City Council action.

- Transfer of an additional 6 dwelling units in Subarea V from the Deer Canyon Parcel (approximately 60 acres) to the Lorenz Parcel (approximately 78 acres). This will allow construction of 46 dwelling units on the Lorenz Parcel.

- Transfer of title to the Deer Canyon Parcel to the United States Government or an agency thereof as may be directed by the City of San Diego.

- Establishment and approval by the City and wildlife agencies of a ~~20~~24-acre mitigation land bank on Parcel A in Neighborhood 8A within Carmel Valley Community Planning Area.

- Establishment and approval by the City and wildlife agencies of a 100- to 130-acre mitigation land bank in Subarea III of the NCFUA.

- Transfer of title to Parcel A and B within Neighborhood 8A of Carmel Valley to the City by Pardee, exclusive of those areas utilized for the ~~20~~24-acre mitigation land bank.

- Pardee will convey to the City MHPA land within Subarea III exclusive of the area utilized for the mitigation land bank in Subarea III.

- With a successful phase shift vote, Pardee will agree to reduce the development within the mesa top portion of the Carmel Valley Neighborhood 8C Precise Plan.

Other Discretionary Permits: Responsible and trustee agencies may include the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). Because the coastal California gnatcatcher is listed as a threatened species, authorization by the USFWS and CDFG is required prior to any "take" of coastal sage scrub. The City of San Diego has the authority to issue authorizations for "take" of the California gnatcatcher pursuant to the federal Endangered Species Act, and Section 2835 of the California Endangered Species Act. Development of the project site as proposed may require placement of fill within wetlands which would require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. In addition, alteration of streambeds by project grading may require a 1601/1603 agreement from the CDFG.

Chapter Four
Environmental Analysis

A. Land Use

Existing Conditions

a) Existing and Surrounding Land Use Characteristics

Pacific Highlands Ranch contains 2,652 acres. Until now, this area has been known as Subarea III of the NCFUA. As shown in Figure 2-2, much of Pacific Highlands Ranch is currently used for nursery operations, commercial agriculture, large-lot single-family residences, and equestrian activities. The nursery operations are mainly located along Black Mountain Road and grow flowers, palms, and other plants for landscaping purposes. The main agricultural commodity in the project area is pole tomatoes. Most of the tomato farming takes place on the upland mesas north of Gonzales Canyon. Equestrian activities take place on two horse ranches located on the western end of Gonzales Canyon and in the southeastern corner of the project area. There are 10 existing single-family residences within the project area as well as the 29-unit Rancho Glens Estates subdivision along Caminito Mendiola in the eastern portion of the site. Most of the remaining area in the southeastern portion of the site is currently undeveloped open space, with the exception of two small salvage yards that are being operated in this area.

In the western portion of Pacific Highlands Ranch is the 389-acre Del Mar Highlands Estates project site. In April 1997, a proposal to develop a 172-unit clustered PRD was approved by the City Council. Also, a CUP (five acres) was approved for a pet care facility in 1995 in Carmel Valley at the southern boundary of the subarea.

Surrounding land uses to the north and west include estate residential development in Fairbanks Ranch, Del Mar Country Club, equestrian uses, plant nurseries, and residential development in the Carmel Valley community. Immediately east and south of the project site are open space areas of Subareas IV and V, respectively, of the NCFUA. An

approved and partially built project in the County of San Diego, The Lakes, exists adjacent to the northeastern boundary.

b) Existing Land Uses Designations, Plans, and Policies

The majority of Pacific Highlands Ranch is designated in the City's Progress Guide and General Plan (City of San Diego 1985) as an area for future growth. Future Urbanizing areas contain "land which is presently vacant and for the most part zoned for agriculture. This land is to be held as an 'urban reserve', and will be released for development as the planned communities are built out or as opportunities to implement the balanced housing or land use goals of the City arise" (City of San Diego 1979:17). The Guidelines for Future Development section of the General Plan states, "the designation of land in this category is not permanent, it is an interim or urban reserve designation. Its purpose is to preclude premature development and to guide urbanization" (City of San Diego 1979:24). Adoption of the Framework Plan for the North City Future Urbanizing Area in October 1992 amended the General Plan circulation and open space designations for the area. Figure 4A-1 illustrates the land use designations within the Framework Plan on Pacific Highlands Ranch and the surrounding area.

The majority of Pacific Highlands Ranch is zoned A-1-10, which allows for limited development or improvement, with structures allowed only for residences, churches, utility substations, or structures associated with agricultural pursuits, such as stables or stands for the sale of agricultural crops produced on the premises. One dwelling unit per 10 acres is allowed in the zone, with a 10-acre minimum lot size, except under PRD clustering. Pursuant to the City Zoning Ordinance, a "rural cluster" development can also occur which preserves the remainder of the property in an undeveloped state until development at urban densities is appropriate. This provision is augmented by City Council Policy 600-29, which specifically applies to PRD clustering within the Future Urbanizing area at a maximum density of one dwelling per four acres.

Figure 4A-2 illustrates the planning areas adjacent to the project site. Lands to the north and west of Pacific Highlands Ranch are developed or in the process of developing. Pacific Highlands Ranch is bordered by other primarily undeveloped subareas of the NCFUA on the east and south. Subarea IV is immediately to the east and Subarea V is directly to the south. The existing community of Fairbanks Ranch forms the subarea's northern border, while Carmel Valley (formerly North City West) constitutes the western boundary. These communities and their plans are summarized below.

Fairbanks Ranch

The community of Fairbanks Ranch, along with the Del Mar Country Club, exists along much of the northern border of Pacific Highlands Ranch in the county of San Diego. The

Legend for Figure 4A-1

Compact Community Uses

- Mixed Use Community Core
  - retail and service
  - office
  - public and semi-public uses
  - residential
  - 32 du/gross acre average
  - (with density bonus, up to 40 du/gross acre)
- Core Residential
  - 21 du/gross acre average
  - (with density bonus, up to 24 du/gross acre)
- Peripheral Residential
  - 7 du/gross acre average
  - (with density bonus, up to 8.7 du/gross acre)
- Low Density Residential
  - 4 du/gross acre average
  - (with density bonus, up to 5.2 du/gross acre)
- Moderately Low Density Residential
  - 1.6 du/gross acre average
  - (with density bonus, up to 2 du/gross acre)
- Very Low Density Residential
  - .8 du/gross acre average
  - (with density bonus up to 1 du/gross acre)
- Estate Residential
  - .2 du/gross acre average
  - (with density bonus, up to .25 du/gross acre)
- Local Mixed Use Center
  - local-serving retail
  - public and semi-public uses
  - residential
  - 16 du/gross acre average
  - (with density bonus up to 17.2 du/gross acre)
- Employment Center
- Service Commercial
- Environmental Tier

Circulation Network

- Major Roadway (Generalized Alignment)
- Freeway
- Proposed Freeway
- Interchange
- Transit Emphasis
- Transit Exclusive Right-of-Way
- HS — High School
- JH — Junior High/ Middle School
- P — Community Park
- City Operations Station
- NCFUA Boundary
- Subarea Boundaries
- Retail Center (outside NCFUA)
- Major Employment Center (outside NCFUA)
- Regional Transit Terminal

Source: North City Future Urbanizing Area Framework Plan,City of San Diego 1992

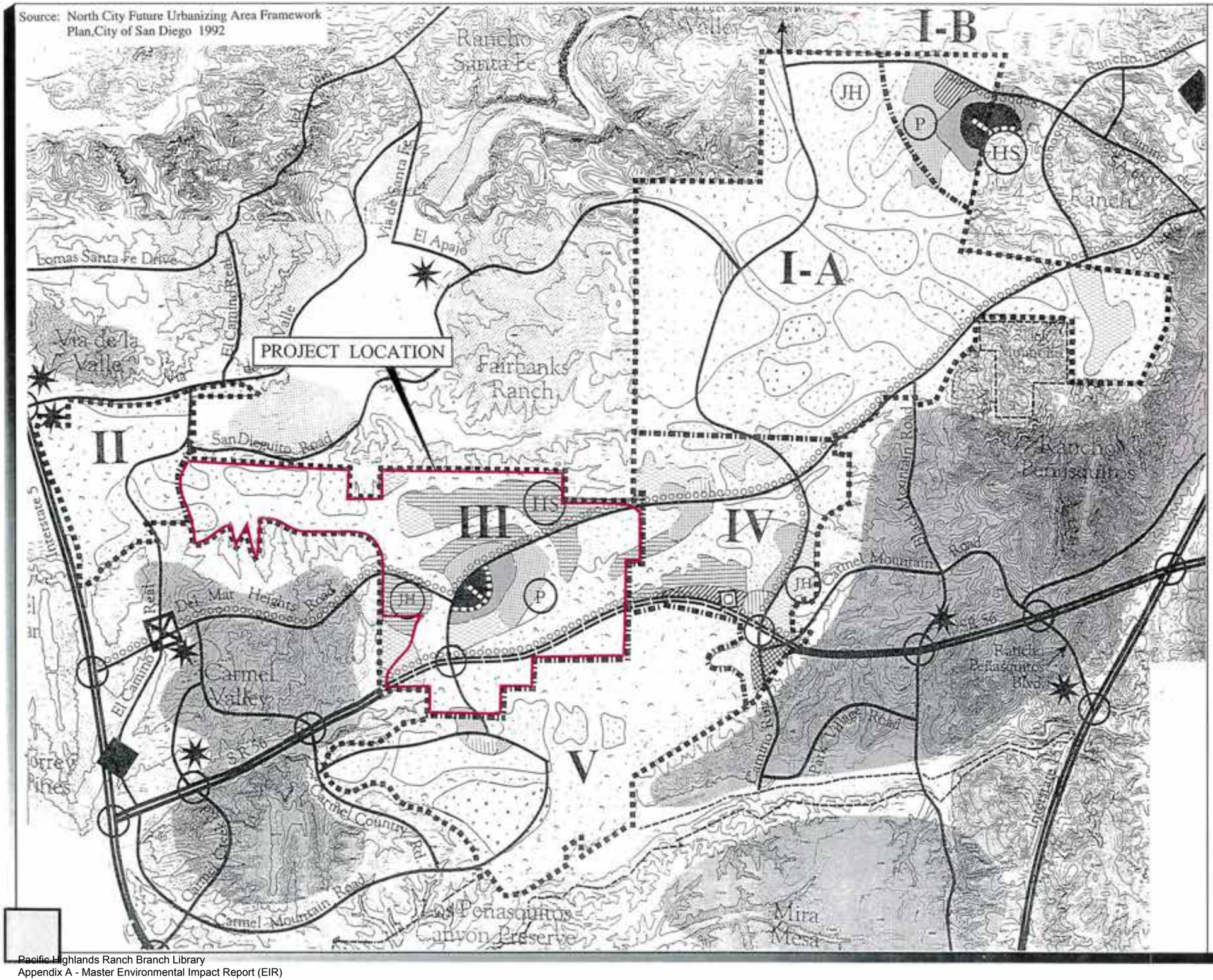
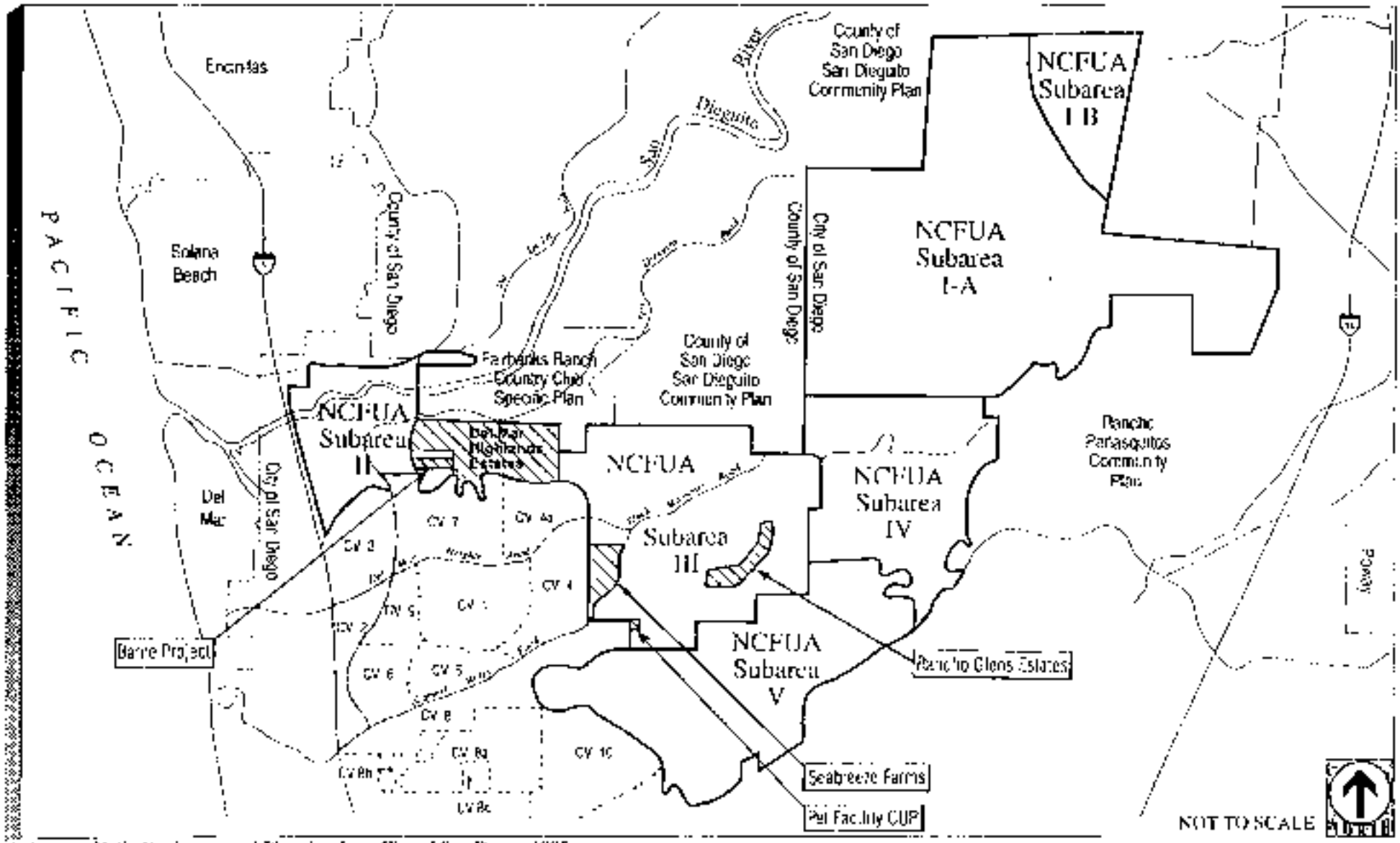


FIGURE 4A-1

Framework Plan
Land Uses



Source: Helix Environmental Planning from City of San Diego 1995

FIGURE 4A-2

Surrounding Community and Specific Planning Areas

CV Carmel Valley Community Neighborhood

NCFUA North City Future Urbanizing Area

bulk of the land is designated as open space, with the remaining land developed and being developed with estate single-family residences and the golf course.

Carmel Valley Community Planning Areas

The Carmel Valley Community Plan (formerly known as the North City West Community Plan), adopted in 1975, calls for the phased orderly development of approximately 4,285 acres of land with commercial, residential, industrial, and public facility land uses. The community plan identifies 9 development units, or neighborhoods, each of which requires the adoption of a precise plan consistent with the community plan prior to development. Since the adoption of the community plan, several of the neighborhoods were split, creating 13 neighborhoods shown on Figure 4A-2. Eleven of the 13 neighborhoods have adopted precise plans. The remaining two are Neighborhood 8A and 8B. The recently approved Neighborhood 8C Precise Plan and VTM represents a new precise planning area which was formerly within Neighborhood 8A. As shown on Figure 4A-2, Neighborhoods 4 and 4A border Pacific Highlands Ranch on the west.

Seabreeze Farms Estates

This 72-acre property is located in the southwestern portion of Pacific Highlands Ranch; however, in November 1996, voters approved a phase shift to remove the project site from the Future Urbanizing area. This approved residential project includes 255 units, an eight-acre equestrian center, and approximately 35 percent of the property dedicated to open space.

Subarea II

Subarea II lies to the northwest of Pacific Highlands Ranch within the NCFUA. This subarea is not being planned at the current time. Pursuant to the Framework Plan, this area is designated for a total of 230 single-family detached dwelling units. There are no other designated land uses except for open space.

Subarea IV (Torrey Highlands)

Subarea IV is comprised of 1,522 acres located in the eastern portion of the NCFUA. It stretches from the upper reaches of La Zanja Canyon in the northwestern portion of the subarea to Deer Canyon, which extends east to west along the southern boundary of the subarea. McGonigle Canyon bisects the property in a southwesterly direction. Subarea IV lies between Pacific Highlands Ranch and the Rancho Peñasquitos Community Plan area, with Subarea V to south and Subarea I to the north. The Subarea Plan was approved in 1996 for a maximum of ~~2,850~~ 2,600 dwelling units with densities ranging from one dwelling unit per acre to 10 to 20 dwelling units per acre with the local mixed use centers in the subarea.

Subarea V (Del Mar Mesa)

Subarea V is located in the western portion of the NCFUA, east of El Camino Real and Carmel Valley, south of McGonigle Canyon and north of Los Peñasquitos Canyon Preserve. Currently, there are existing low-density residences located in parts of Subarea V. In June 1996, the City Council adopted the Del Mar Mesa (Subarea V) Specific Plan, which provides for the future development of up to 685 dwelling units and significant open space system on approximately 2,042 acres in the plan area.

c) City of San Diego Progress Guide and General Plan

The General Plan has a number of environmental goals that are pertinent to Pacific Highlands Ranch. These include:

Conservation

- Wise management and utilization of the City's remaining land resources, and preservation of its unique landforms and the character they impart to San Diego.

- Retention of premium agriculturally productive lands in agricultural usage.

Open Space

Establishment of an open space system which provides for the preservation of natural resources, the managed production of resources, the provision of outdoor recreation, the protection of public health and safety, and the utilization of the varied terrain and natural drainage systems of the San Diego community to guide the form of urban development.

Guidelines for Future Development

Preservation of environmental quality by preservation of open space and vistas and by reduction of air, noise, and water pollution.

d) City of San Diego Planning and Development Policies

Development within the Future Urbanizing area is guided by several City planning and development policies. The NCFUA Framework Plan identifies specific policies for land use, urban design, and open space (including the Environmental Tier) development in the NCFUA. City Council Policies 600-10, 600-29, 600-30, 600-40, and the Resource Protection Ordinance also apply to the subarea. These policies are discussed below.

NCFUA Framework Plan Policies

The North City Future Urbanizing Area Framework Plan dated October 1992 amended the Progress Guide and General Plan and contains development policies for six topics: land use, urban design, open space, transportation, affordable housing, and public

facilities and financing. The Framework Plan sets forth "Guiding Principles" and "Implementing Principles" for these topics.

Future land uses and transportation corridors in the NCFUA are depicted on the Framework Plan diagram (see Figure 4A-1). The Framework Plan includes text and tables that define the legend categories in greater detail and show the distribution of land use by acre for each of the subareas. The Framework Plan also provides a composite diagram showing the Environmental Tier and other open space information (Figure 4A-3).

The land use chapter of the Framework Plan contains eight Guiding Principles for Land Use. These include:

- Create a pattern of land use and conservation that is clearly distinguishable from surrounding communities that fosters appealing and enjoyable neighborhoods and business districts.

- Incorporate into the NCFUA a permanent Environmental Tier of open space lands with high natural resource value that function as natural habitat, form connections to surrounding open spaces, and give shape and definition to surrounding built areas. Use natural resources as a foundation for designing the area's land use plan.

- Concentrate residential development in specific areas to create compact neighborhoods that have an urban character and that include varied types of housing and a range of affordability supported by a mix of shops, services, employment, and public activities that can be reached by foot, bicycle, and transit.

- Designate employment centers in locations that are near shops, services, housing, and transportation.

- Integrate facilities for non-automobile travel into the NCFUA transportation system, and support alternatives to automobile use through land use and urban design principles.

- Limit adverse impacts on surrounding communities by providing needed public facilities within the NCFUA, coordinating planning with surrounding areas, and restricting land use intensity to avoid severe traffic impacts in neighboring communities.

- Include in the NCFUA public facilities that will be needed by area residents, in order to meet their needs, to provide for convenience and community identity within the NCFUA, and to minimize impacts on services outside of the NCFUA.

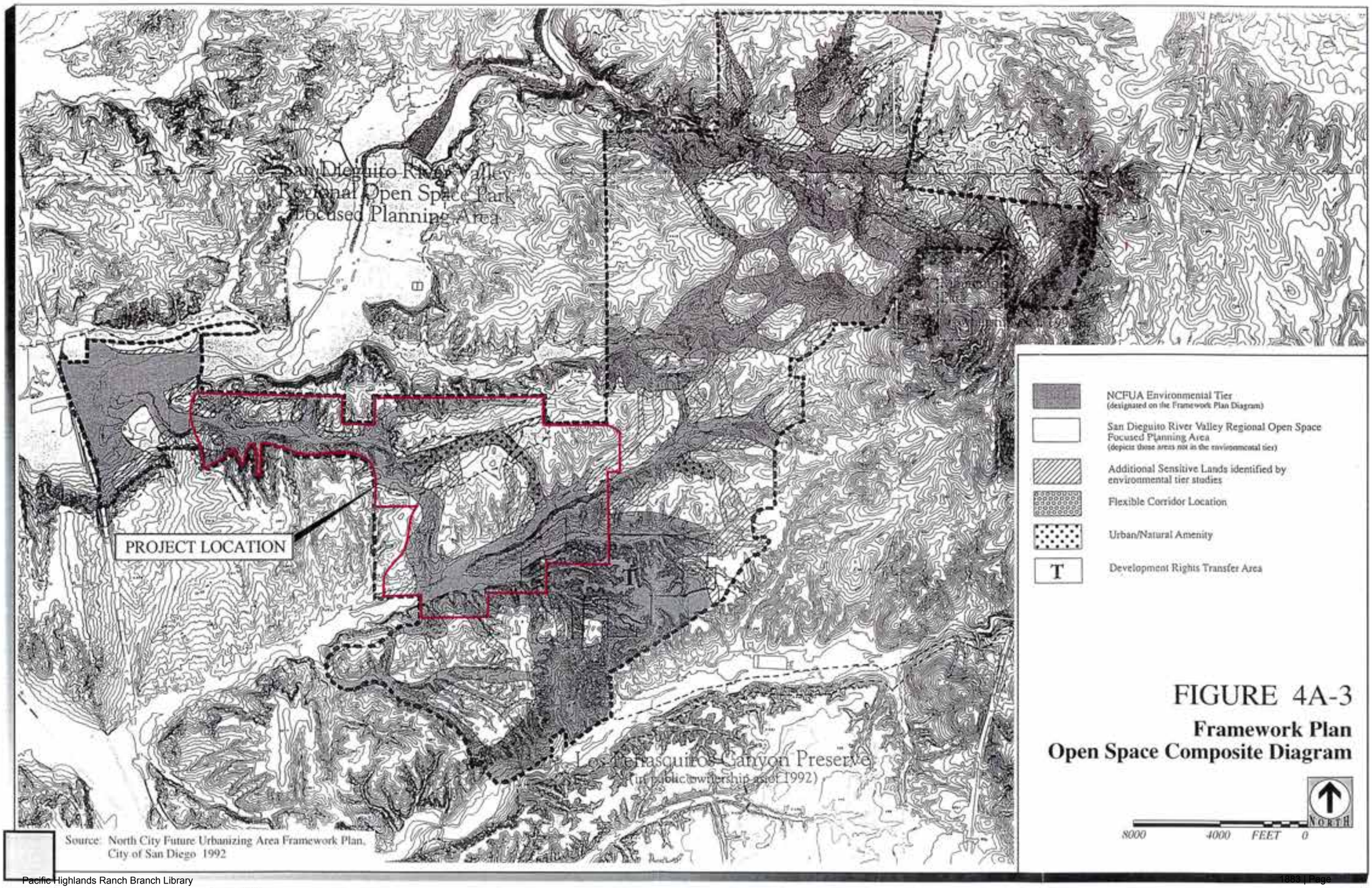


FIGURE 4A-3

Framework Plan
Open Space Composite Diagram

- Implement Framework Plan principles through preparation of a series of subarea plans that conform to the Framework Plan, provide needed detailed studies, and are coordinated with other planning efforts undertaken by the City, San Diego County, San Diego Association of Governments, and other public agencies.

The Guiding Principles for Urban Design include:

- Two compact communities should be developed in designated areas with densities that promote pedestrian activity and transit use. The compact communities must have a relatively dense, urban character that emphasizes mixed-use development, residences within walking distance of shops and transit, and accessible public places. This pattern will be an alternative to uniform low density suburban development that creates monolithic communities and consumes large land areas.

- The mixed use community core should be designed to create high-quality pedestrian environments with building densities sufficient to support walkable shopping districts.

- The core residential areas should contain a mix of housing types within walking distance of the community core. The planning and design of all development in these neighborhoods must create a high-quality pedestrian environment with a horizontal mixed-use pattern of small project and parcel sizes.

- Peripheral residential areas should contain a mix of duplex, triplex, and attached townhouses integrated with single-family detached units to achieve a diversity of house types and affordability. The peripheral residential areas should have direct pedestrian and bicycle linkages to the community core. Normally, peripheral residential areas should be within one mile of the community core.

- Local mixed-use centers should follow the same design principles for access, streetscapes, building frontages, pedestrian emphasis, mixed-use development, and parking as the mixed-use community cores.

- The many canyon and valley views are primarily local, short-range views that can be seen from existing public roads, public open spaces, and private lands. The location of the freeway, streets, and roads throughout the study area will effectively "open up" an extensive network of public view corridors.

The Guiding Principles for Open Space include the following:

- Create the Environmental Tier, an interconnected, viable system of natural open space that serves to protect and conserve cultural resources, flora, and fauna that occur in the NCFUA.

- Conserve biological diversity by setting aside relatively large areas of natural open space/habitat, linked with corridors and protected from human activities detrimental to this purpose.

- Preserve floodplains and significant topographic features such as canyons, ridges, and hillsides.

- Promote subarea- and project-level planning that preserves as open space significant natural features within development areas.

- Provide for refinement of the Environmental Tier as shown on the Framework Plan diagram based on field assessment of resources and detailed land use planning.

- Within the Environmental Tier, provide for some low-impact forms of recreation such as walking, bicycling, and nature watching.

In addition to these guiding principles, the NCFUA Framework Plan specifies a number of implementing principles for each of these topics.

City Council Policy 600-10, "Adequacy of Public Services in Connection with Development Proposals"

This policy addresses the timing of the provision of public services for new developments to insure that services are available concurrently with need. It requires that:

- New development be consistent with a master development plan for the general area which has been reviewed by the Planning Commission and adopted by the Council;

- The development includes an implementation section which sets forth in detail measures which will be taken to insure that needed public services are provided concurrent with need in the development; and

- The proponent presents evidence satisfactory to the appropriate body or agency that the required public services will in fact be provided concurrent with need.

City Council Policy 600-29, "Maintenance of Future Urbanizing Area as an Urban Reserve"

This council policy states that the City's objectives in land use decision-making in the Future Urbanizing area are "to avoid premature urbanization, to conserve open space and natural environmental features, and to protect the fiscal resources of the City by precluding costly sprawl and/or leapfrog development."

Policy 600-29 presents options for limited development in the Future Urbanizing Area. These include:

- Development pursuant to the A-1 zoning regulations, at the density and minimum lot size permitted in the applicable zone.

- Development pursuant to the Rural Cluster Development regulations, at the density permitted in the applicable zone, but clustered in order to promote more efficient land utilization and land conservation; to allow development in patterns more consistent with that occurring in adjacent areas; to avoid fragmentation of land ownership patterns which would mitigate against future development opportunities; to allow for reasonable development opportunities during the planning period without foreclosing future development choices; and to make annexation of unincorporated land more attractive where such lands will be brought into the Future Urbanizing area.

- Development pursuant to the Planned Residential Development regulations, at a density not to exceed one dwelling unit per four acres, in order to promote the permanent preservation of lands designated in the General Plan as part of the Environmental Tier through the provision of public and private open space easements and/or dedications; provided, however, that in return for the density increase granted by the City Council no future development rights shall remain on the property.

- Development pursuant to the Conditional Use Permit regulations, provided that the conditional uses are natural resource-dependent, non-urban in character and scale, or of an interim nature which would not result in an irrevocable commitment of the land precluding future uses.

City Council Policy 600-30, "General Plan Amendments to Shift Land from Future Urbanizing to Planned Urbanizing Area"

This council policy was amended following the passage of Proposition A in 1985. Proposition A was a voter-passed initiative which requires that projects located in the Future Urbanizing area which propose a shift to the Planned Urbanizing area require a majority approval vote of the people at a city-wide election. The council policy applies to all shifts of land from Future Urbanizing to Planned Urbanizing prior to a General Plan Amendment. The policy states that no land shall be shifted from Future Urbanizing to Planned Urbanizing except by a General Plan Amendment approved by the City Council and a majority approval vote at a city-wide election. Once land is shifted, a rezone or subsequent development approval shall be in accordance with applicable requirements. Finally, a General Plan Amendment to shift land may be initiated by the City on its own motion or by a property owner.

City Council Policy 600-40, "Preparation of Long Range Plans"

Council Policy 600-40 was created in order to ensure that the preparation and adoption of long-range plans for the city include a thorough analysis of the constraints and opportunities of the planning area, including but not limited to the resources protected by the Resource Protection Ordinance (City of San Diego 1991). In addition to ensuring a thorough analysis of the site at an early stage in the planning process, the purpose of 600-40 is to (1) aid in the review of permits and maps in the planning area, (2) ensure protection of environmental resources by preserving contiguous open space systems and providing mechanisms to acquire or protect these resources, and (3) ensure that adopted land use policies and objectives are considered in the context of the suitability of the plan area for development (City of San Diego 1991).

According to Council Policy 600-40, a development suitability analysis is to be conducted for all long-range plans, such as the Pacific Highlands Ranch Plan, to ensure that environmental resources and other site constraints and opportunities are fully considered in preparation of the plan. This policy goes on to state that "Development, including land uses, roads, and other facilities, shall be distributed so as to minimize encroachment into hillsides, biologically sensitive lands, significant prehistoric and historic resources and other resources addressed in RPO. Mechanisms to protect these resources must be addressed in the long-range plans in sufficient detail to adequately evaluate future applications for permits and maps in the planning area, and to ensure reasonable use of land or appropriate compensation for all property owners." It is the City's objective that substantial acreages of habitat be preserved by implementing the long-range plan which could not be achieved if the property was developed on a parcel-by-parcel basis.

Council Policy 600-40 also requires that the City Manager's recommendation on the draft precise plan be based upon the site suitability analysis, which enables the decision maker to determine the consistency of the plan with RPO and other adopted General Plan and City Council policies and objectives. If future projects or permit applications within the precise plan area are found to be consistent with the precise plan, future RPO permits may be approved using the "Substantial Conformance" provision in the alternative compliance process contained in RPO. If a long-range plan is found not to be consistent with RPO, then an alternative concept plan shall also be presented to the decision maker which would be consistent.

Resource Protection Ordinance

As noted above, Pacific Highlands Ranch is subject to the regulations of the City of San Diego's Resource Protection Ordinance, adopted in 1989 and most recently revised in January 1998. The purpose and intent of this ordinance is "to protect, preserve, and, where damaged, to restore the environmentally sensitive lands of San Diego, which includes wetlands, wetland buffers, floodplains, hillsides, biologically sensitive lands, and

significant prehistoric and historic resources." The provisions of the ordinance are applicable to floodways and 100-year floodplain fringe areas, all wetland and wetland buffer areas, all hillside areas of 25 percent or greater as defined by the Hillside Review Overlay Zone, all biologically sensitive lands, and all significant prehistoric and historic sites and resources. RPO requirements in these areas follow:

Wetlands. Permitted uses in wetlands are limited to wetlands related scientific research, wetlands related educational uses, and essential public service projects, where it has been determined that there is no feasible less environmentally damaging location or alternative and where mitigation measures have been provided were added as permitted uses.

Wetland Buffer Areas. A 100-foot-wide wetland buffer shall be maintained unless it is demonstrated that a buffer of lesser width will protect the wetland resources. Permitted uses in the buffer areas are all uses permitted in wetlands, passive recreational uses, access paths, public viewpoints, and improvements necessary to protect adjacent wetlands. These uses are permitted provided such uses are compatible with protecting wetlands and do not harm the natural ecosystem.

Floodways. Permitted uses in floodway areas are those uses allowed by the floodway zone subject to the ordinance, General Plan Circulation Element or new community plan roadways, channelization for necessary water supply projects, flood control projects, and improvement of fish and wildlife habitat.

Floodplain Fringe. Permitted uses in the floodplain fringe are those uses allowed by the underlying zone subject to the ordinance, new community plan or General Plan Circulation Element roadways, low-intensity recreational uses, sand and gravel extraction (subject to a conditional use permit), and permanent structures and/or fill under certain conditions.

Hillsides and Biologically Sensitive Lands. Hillsides encompassing slopes of 25 percent gradient or more and with an elevation differential of 50 feet or more are considered sensitive under the ordinance. Native biological communities or any vegetative community supporting state or federally listed or candidate species are considered sensitive, along with designated plant or wildlife species.

A minimal encroachment is allowed into hillsides and biologically sensitive lands, per formulas provided in the ordinance. The encroachment is not to adversely impact state or federally listed rare, threatened, or endangered species or wetlands. RPO combines the allowed encroachment for hillsides and biological resources, based on the proportion of each resource, to set the encroachment allowance. Development beyond the encroachment allowance for biologically sensitive lands shall not be permitted unless all feasible mitigation to protect and preserve these lands is required as a condition of approval. Exceptions to the encroachment allowance may be considered for community

plan and General Plan Circulation Element roads, local public streets, public utility systems, some public facilities, brush management for fire protection, and some sand and gravel operations.

Significant Prehistoric and Historic Resources. Although significant prehistoric and historic resources are defined under CEQA and must be addressed as significant resources, RPO further distinguishes sites of outstanding scientific, heritage, or religious significance. Permitted uses are those allowed by the underlying zone subject to RPO. Development is not permitted in significant prehistoric or historic sites or resources.

e) San Dieguito River and MSCP Planning Documents

San Dieguito River Regional Plan

This plan was adopted by the City Council in October, 1984. The plan is intended to serve as a comprehensive planning framework for the San Dieguito River basin and combined the planning documents and policies of many jurisdictions and agencies with responsibilities and interest in the river basin. Generally, the plan's goals are to preserve the open space character, significant water resources, and landscape that make the San Dieguito River basin unique, as well as the various natural, cultural, and aesthetic resources in the basin. The following are major goals of the regional plan:

- To preserve the function of the San Dieguito River basin as an open space corridor through the protection of the contiguous nature of the existing dominant landscape features.

- To protect and preserve significant natural, cultural, and aesthetic resources, including the visual integrity of the river basin.

- To ensure compatibility between various land uses.

- To preserve water quality and quantity.

From the above goals, the following is a summary of the relevant general recommendations which were established:

- Preservation of the San Dieguito River basin's recreation/open space potential should be the highest priority in considering land use issues.

- Establishment of a recreation/open space corridor through the river basin. This corridor would extend from the coast, inland to Sutherland Reservoir. As a first step in establishing a recreation/open space corridor, emphasize existing and proposed recreation programs and plans.

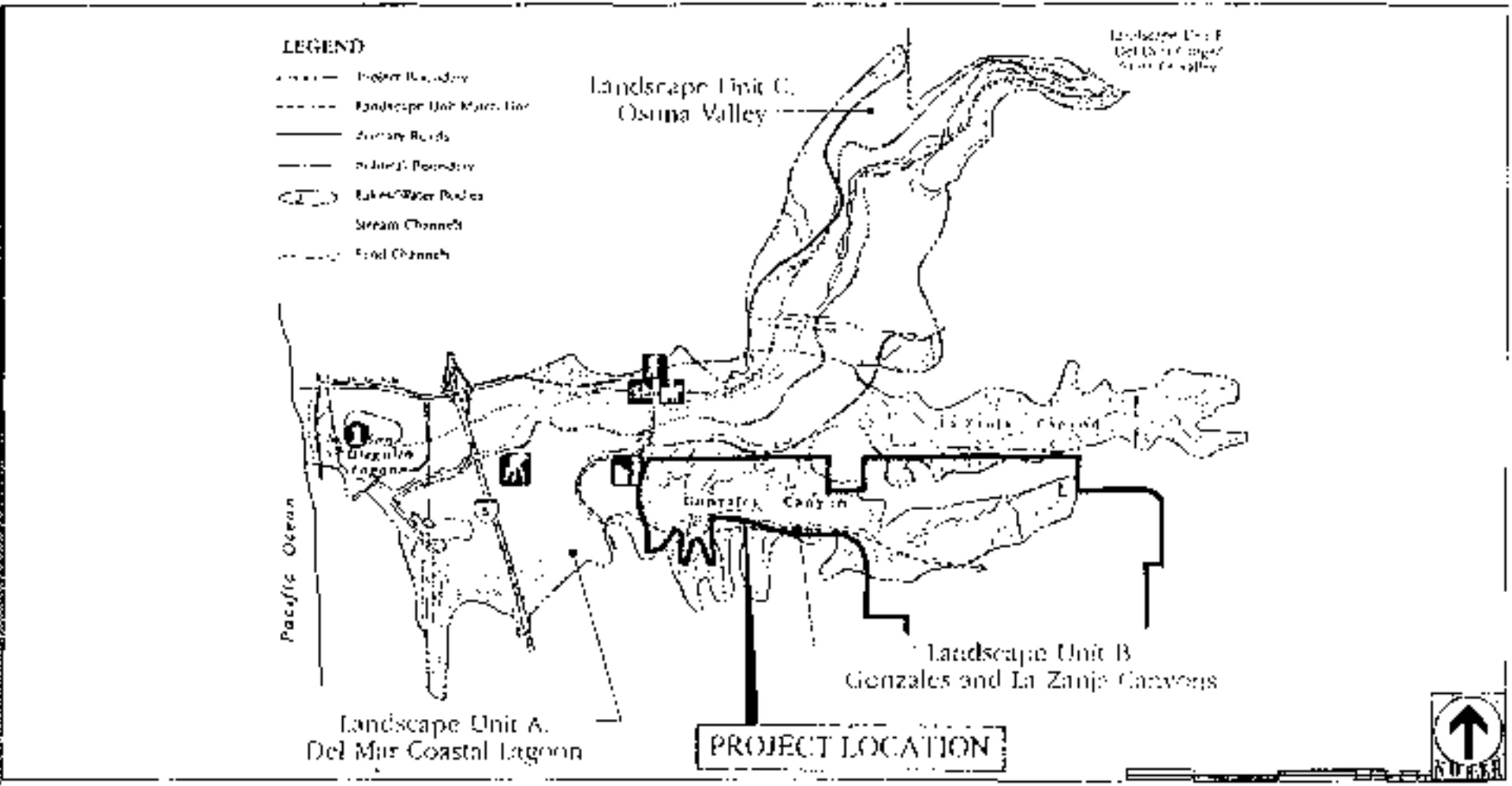
- Promotion of alternate modes of transportation within the recreation corridor to minimize vehicular impacts upon the recreational potential.

The San Dieguito River Regional Plan is intended to be a generalized plan. It identifies the need for more detailed planning to occur in the form of area, community, or specific plans. The plan addresses the entire river valley from the Pacific Ocean northeasterly to Sutherland Reservoir. It divides the valley into six subareas for planning purposes. The Regional Park Plan recommends rural residential development (less than 1 dwelling unit per acre), agriculture, and recreational/open space uses for those areas immediately adjacent to Pacific Highlands Ranch.

San Dieguito River Valley Regional Open Space Park Concept Plan

In June 1989, the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA) was established for the primary purpose of planning and acquiring a greenbelt and park system within the San Dieguito River valley. The JPA has been empowered by its member agencies (County of San Diego and the Cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach) to acquire, hold, and dispose of property for park purposes and to plan, design, improve, operate, manage, and maintain the San Dieguito River Valley Regional Open Space Park. Thus, the planning process which began with the City's San Dieguito River Regional Plan is continuing under the jurisdiction of the JPA. The JPA is further empowered to establish guidelines for and advise public agencies on appropriate land uses within the San Dieguito River Park. In order to accomplish these objectives, the JPA mapped an 80,000-acre Focused Planning Area (FPA) for the San Dieguito River Park and adopted a concept plan for the FPA on February 18, 1994. The purpose of the concept plan is to set forth the vision, goals, and objectives of the park, as well as to establish the overall planning framework for future park development within the FPA. The JPA itself does not have land use authority over the properties within the FPA. Significant elements of the San Dieguito River Park Concept Plan were incorporated into the San Pasqual Valley Plan, which was adopted by the San Diego City Council in 1995. In addition, the Park's goals and objectives are incorporated into the Land Use, Urban Design, Open Space, and Transportation chapters of the Framework Plan. ~~and the City of San Diego has not yet incorporated any part of the concept plan into City planning documents, although several Framework Plan policies address the park.~~

The FPA extends for 55 miles from the river's source on Volcan Mountain near Julian to the ocean at Del Mar. It contains both private and publicly owned lands and roughly corresponds to the viewshed of the San Dieguito River valley and its major tributary canyons. This river system forms a natural corridor, connecting a wide variety of native environments and vegetation types. Figure 4A-4 shows the boundaries of the FPA within the project area. As shown, almost all of the approved Del Mar Highlands Estates project (the western portion of Pacific Highlands Ranch) is included in the FPA. The FPA



Source: San Dieguito River Park Joint Powers Authority 1994

FIGURE 4A-4

San Dieguito River Valley Regional Open Space Park Concept Plan

continues along Gonzales Canyon, the San Dieguito River valley, and La Zanja Canyon (see Figure 4A-4). Gonzales and La Zanja Canyons are identified by the concept plan as important wildlife habitat links and open space trail connections to Carmel Valley. The plan states that special attention should be given to viewsheds of specific activity areas, although buffering of development with trees would be appropriate where compatible with wildlife habitat.

The vision of the concept plan is "to create an open space park within the 55-mile-long San Dieguito River valley that will protect the valley's unique resources, while providing compatible recreational opportunities for the San Diego region." The stated overall goal of the concept plan is to "preserve land within the FPA of the San Dieguito River Park as a regional open space greenway and park system that protects the natural waterways and the natural and cultural resources; provides compatible recreational opportunities that do not damage sensitive lands; and provides a continuous and coordinated system of preserved lands with a connecting corridor of walking, equestrian, and bicycle trails encompassing the San Dieguito River valley from the ocean to the river's source and beyond." The general objectives for the park, as stated in the concept plan, are as follows:

- Preservation of open space
- Conservation of sensitive resources
- Protection of water resources
- Preservation of the natural floodplain
- Retention of agricultural uses
- Creation of recreational and educational opportunities
- Establishment of design guidelines

The concept plan divides the FPA into landscape units based on the differing physical characteristics of each unit. The preparation of master plans for each landscape unit is encouraged. Pacific Highlands Ranch is within Landscape Unit B. The concept plan acknowledges that much of the natural habitat within this landscape unit has been disturbed by existing land uses. However, the finger canyons between Gonzales and La Zanja Canyons and the San Dieguito River are identified as important wildlife links and open space trail connections. The mesas and upland slopes of these drainages are identified as "a very important frame to the view of the valley as it narrows." Within Landscape Unit B, the concept plan calls for:

- Dedication of open space corridors within Gonzales and La Zanja Canyons in conjunction with development. These corridors should be of adequate size to accommodate both wildlife and human movement. Existing sensitive habitat in these corridors should be preserved and, where necessary, native habitats should be restored.

- Setback of development on the adjacent ridges from the top of slope in order to reduce its visibility from the river valley and canyons, as well as to provide for an upland transition area that will serve to buffer the development from the adjoining natural habitat. Architectural treatment should be sensitive to the views from the park, and appropriate landscaping should be provided within a transition buffer area to help screen the development.

- Construction of canyon overlooks or viewpoints within future development proposals that will provide visual access to interested park visitors.

- Maintenance and improvement of the equestrian facilities within this landscape unit.

- Sensitive siting of trails intended for hiking and equestrian use that connect to the regional trail systems in Los Peñasquitos Canyon Preserve, Black Mountain Park, and Carmel Valley. Existing trails and dirt roads should be utilized wherever feasible.

- Provision of a small trail staging area within this landscape unit for parking and access to the proposed trail system.

- Development of a park headquarters in Landscape Unit A or B that, in addition to administration, could serve as a park information and visitor's center, provide ranger housing and a central location for docent and volunteer programs, and provide a base for scientific research and educational programs on coastal wetlands.

The concept plan also lists implementing principles for development adjacent to the San Dieguito River Park FPA. These principles call for minimizing alteration of drainage ways and landforms, conforming development in hillside areas to the natural setting, preserving significant native vegetation, and clustering units where appropriate to minimize intrusion into sensitive habitat areas. Additional principles encourage blending of development with the hillside background and topography, preservation of public views, restoration of disturbed open space areas, minimal grading, setbacks from ridges and bluffs, use of landscaping as screening, use of shielded low-sodium exterior lighting, and variation of rooflines. On May 19, 1995, the JPA adopted a Private Property Rights Protection Policy which reiterates that the JPA does not have land use authority and states that the JPA respects private property rights and will not recommend or participate in hostile condemnation of private property for park purposes. It further states that the right to review and comment on private development proposals is in an advisory capacity only.

Multiple Species Conservation Program

In 1991 the City of San Diego and other land use jurisdictions in southwestern San Diego County began development of the Multiple Species Conservation Program to meet the Metropolitan Wastewater Department's need to mitigate the direct biological impacts

associated with mandated improvements to the region's sewage treatment facilities. The MSCP effort was also directed toward mitigating the secondary biological impacts associated with projected growth in the region.

The MSCP is designed to identify lands that would conserve habitat for federal and state endangered, threatened, or sensitive species, including the federally listed threatened California gnatcatcher. The MSCP has been found to be the equivalent of a Natural Community Conservation Plan for the area, consistent with the federal Endangered Species Act Section 4(d) rule for the coastal California gnatcatcher that would define conditions under which "take" of the species could occur without violation of the Endangered Species Act. That is, the MSCP is a plan and process for the issuance of permits under the federal and state Endangered Species Acts and the state's Natural Community Conservation Planning Act of 1991.

On March 18, 1997, the City of San Diego adopted the MSCP. An objective of the MSCP is to conserve a connected system of biologically viable habitat lands in a manner that maximizes the protection of sensitive species and precludes the need for future listings of species as threatened or endangered. Responsibilities for conservation planning in the MSCP study area are organized by subareas. The input from the jurisdictions and other special district and agency participants is summarized in the Multi-Habitat Planning Area MHPA maps (see Figures 3-2, 3-3, and 3-4 of the MSCP).

The MHPA is the area within which the permanent MSCP preserve will be assembled and managed for its biological resources. The MHPA is defined in many areas by mapped boundaries, as mentioned above in the referenced figures of the MSCP, and also is defined by quantitative targets for conservation of vegetation communities and goals and criteria for preserve design. Within the NCFUA, the MHPA boundaries are as shown in the Biology section of this MEIR. Resources to be preserved in the MHPA include coastal sage scrub, southern maritime chaparral, various wetland habitats and many sensitive and/or listed plants and animals. The MHPA in this area is largely comprised of regional linkages leading to biological core areas within existing reserves and parks. The City of San Diego MSCP Subarea Plan with respect to the NCFUA states the following: "Subareas III and IV contain only extended regional corridors , linking to the north west and south. These corridors primarily lie in canyons or drainages, and the majority require restoration to enhance their long-term value. The subarea preserve plan also contains a list of specific guidelines for the proposed NCFUA subarea; of which four apply to the proposed project area:

- C 12 Incorporate bridges to facilitate wildlife crossings (MSCP open space to Gonzales Canyon; McGonigle and Deer Canyon areas).

- C 14 Provide fences or barriers along the edges of the shallow north/south-trending canyon that connects Carmel Valley to Gonzales Canyon to direct public access to appropriate locations.

- C 17 If this area develops or redevelops, the MHPA boundary should be accommodated with the majority of the floodplain to be placed in open space and restored where possible to natural habitats.

- C 19 In the event that the MHPA configuration is not implemented pursuant to the "Pardee Settlement Agreement," then the MHPA configuration shall be per the NCFUA Framework Plan. Provide an undercrossing of San Dieguito Road for wildlife movement from Gonzales Canyon of the San Dieguito River.

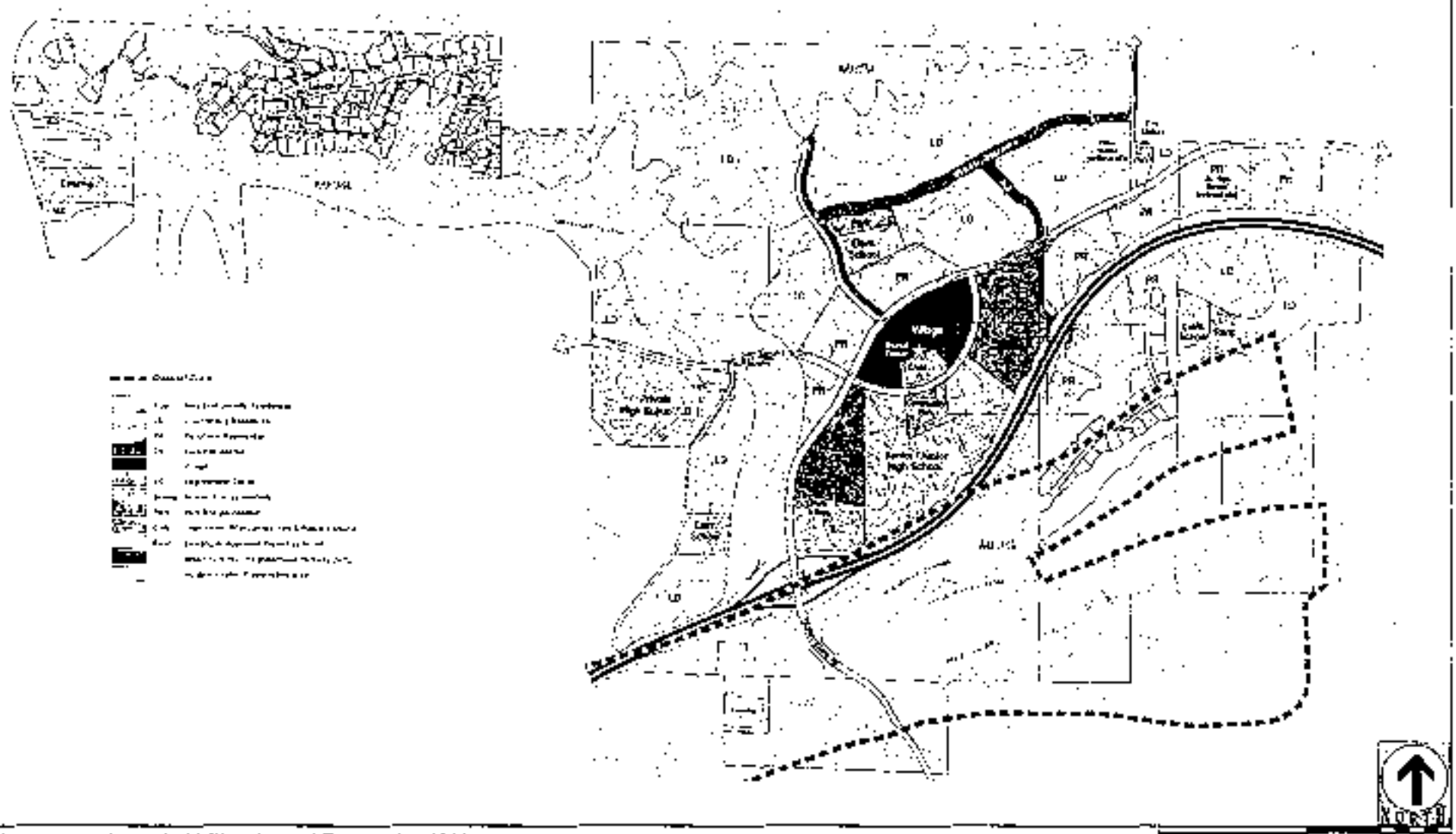
On July 14, 1997, the City of San Diego signed an Implementing Agreement with the U.S. Fish and Wildlife Service and California Department of Fish and Game. The Implementing Agreement is the contract between the City and the wildlife agencies, which outlines the obligations and commitments made for the successful completion of the MSCP. The agreement has been signed by all parties and is effective July 17, 1997.

The Implementing Agreement now allows the City of San Diego to issue Incidental Take Authorizations under the MSCP. The ITAs replace the Interim Habitat Loss 4(d) permit that was established in August 1994 for permitting take of the California gnatcatcher and its associated habitat, coastal sage scrub.

The MSCP amends and enlarges the NCFUA Environmental Tier and supersedes it. Hereinafter, the term "MHPA" is used to refer to the biologic open space system in the Pacific Highlands Ranch Subarea Plan.

f) Local Coastal Program

The North City Local Coastal Program was certified by the California Coastal Commission in 1988. The North City LCP addresses the Torrey Pines, North City West, Mira Mesa, and University-La Jolla communities of the city of San Diego. The coastal zone boundaries for the North City LCP extend up McGonigle and Deer Canyons into Pacific Highlands Ranch (Figure 4A-5). The LCP designates the entire coastal zone within Pacific Highlands Ranch for open space/park uses. The natural resources which are within the coastal zone boundaries in Pacific Highlands Ranch are subject to the policies and ordinances which comprise the North City LCP, as required by the California Coastal Act of 1976, as amended. Relevant issues, goals, and proposals presented in the LCP for this area include:



Map source: Latitude 33 Planning and Engineering 1998

Figure 4A-5

North County Local Coastal Zone
Subarea - Plan 1

- Determination of compatible land uses within areas designed for open space.
- Protection of significant wildlife habitat areas through the designation and protection of sufficient buffer areas.
- Identification of geologic instability and performance standards for grading and construction.
- Protection of important downstream coastal wetland resources through application of appropriate upstream mitigation measures.
- Delineation, protection, and mitigation of existing archaeological and paleontological resources.
- Encouragement of alternative modes of transportation.

The portion of Pacific Highlands Ranch within the coastal zone is under the jurisdiction of the State of California and not the City of San Diego. An amendment to the adopted LCP would be required to bring the LCP land use plan into conformance with the adopted subarea plan.

Land Use Issues

1. Would the proposed project implement the goals, objectives, and recommendations of the City of San Diego Progress Guide and General Plan and the environmental goals of the Framework Plan for the North City Future Urbanizing Area? Would the proposed project implement existing City plans and policies?
2. Would the project result in a conflict with the purpose and intent of the Resource Protection Ordinance?
3. Would the project result in a conflict with the purpose and intent of any current planning process or adopted environmental plans or policies on the area?
4. Would the project be compatible with existing and planned land uses in the project vicinity? Would the uses proposed within the subarea result in any internal land use conflicts?
5. How is the project consistent with the region's Multiple Species Conservation Program and the City of San Diego Subarea Plan?

1) Issue

Would the proposed Pacific Highlands Ranch plan implement the goals, objectives, and recommendations of the City's Progress Guide and General Plan and the environmental goals of the North City Future Urbanizing Area Framework Plan? Would the proposed project implement other existing City plans and policies?

Impacts

a) Consistency with Progress Guide and General Plan

The General Plan's environmental goals for conservation, open space, future development, and preservation of agricultural land are discussed above under Existing Conditions. As they pertain to the proposed Pacific Highlands Ranch Plan, they include the preservation of open space and landforms including undeveloped valleys and canyons. Following is an analysis of both plans' (Plan 1 and Plan 2) consistency with these goals and policies:

Subarea Plan 1. Plan 1 would develop core, peripheral, and low density residential units primarily north of Alignment F of SR-56. The approximately 1,2680-acre open space area, which is a part of the MHPA, would be primarily located in McGonigle and Deer Canyons, along the northern boundary on the north-facing slopes above La Zanja Canyon, and in an unnamed north/south-running canyon in the western portion of the subarea. This north-south tributary would connect with Gonzales Canyon to the north via an animal undercrossing of the SR-56 alignment. The eastern end of Gonzales Canyon and a northerly tributary to McGonigle Canyon would be open space as part of an urban amenity open space. This continuous and connected area would provide a secondary, alternative small wildlife linkage between McGonigle and Gonzales Canyon, as well as visual relief from the proposed development.

Plan 1 for Pacific Highlands Ranch would not provide for agricultural uses as described in the General Plan. As discussed in Chapter 4.1 of this MEIR, Natural Resources/Agriculture, soils on the project site are suitable for agricultural use and much of the northern and western portions of the site have been or are currently supporting agricultural uses. Permanent open space and development are proposed within these agricultural areas. As a result, the project would not be generally consistent with the goal of the General Plan to preserve premium agricultural lands.

The compliance of the proposed Environmental Tier (referred to as the MHPA in this MEIR) with the City's Resource Protection Ordinance is also addressed below under Issue 2.

Subarea Plan 2. Plan 2 would also provide for open space throughout the subareas. Like Plan 1, the MSCP open space preserve area (approximately 1,266~~69~~ acres under Plan 2) would be functionally equivalent with the MSCP design. Plan 2 incorporates Alignment D of SR-56. Also, Plan 2 would not support any agricultural uses.

b) Consistency with the Environmental Goals of the Framework Plan

The environmental goals of the Framework Plan are listed in the Existing Conditions above. These goals relate primarily to the need to preserve natural topographic features and biological resources as open space with the Environmental Tier. Since adoption of the Framework Plan in 1992, the City has prepared a MSCP northern subarea preserve plan to guide implementation of the MSCP in that portion the city. Within the northern subarea, the preserve system is largely comprised of regional linkages leading to biological core areas within existing reserves and parks. This natural open space system associated with the MSCP has refined and superseded the Environmental Tier as described in the Framework Plan.

Following is an analysis of each of the proposed plans' consistency with the environmental goals of the Framework Plan. A detailed discussion of the subarea plan's consistency with MSCP goals and policies is included under Issue 5 below:

Subarea Plan 1. Subarea Plan 1 is considered functionally equivalent with the MSCP preserve design and the Framework Plan's Environmental Tier. As shown in Figure 4A-1, the open space system for the Framework Plan calls for the preservation of McGonigle and Deer Canyons in order to provide a connection with Carmel Valley to the southwest and the area surrounding Black Mountain Park to northeast. An unnamed north/south-trending canyon is shown as connecting the Carmel Valley/McGonigle/Deer Canyons linkage with Gonzales Canyon to the north. Also, an urban/natural amenity is shown as providing an additional wildlife linkage between the main southern linkage and Gonzales Canyon in the north. Figure 3-5 shows the relationship of Plan 1 with the adopted MSCP preserve boundary.

With respect to the circulation system, (see Figure 3-1), Plan 1 would propose a similar circulation system as that anticipated in the Framework Plan. The proposed SR-56 alignment is more northerly and Camino Santa Fe would provide an east-west through link between Carmel Valley Road and the south. Three bridge structures are proposed to be incorporated into SR-56, one bridge in Del Mar Heights Road in the western portion of the subarea and one bridge in the southern portion of Camino Santa Fe/Carmel Valley Road. All of these structures are intended to accommodate wildlife movement, consistent with the goals of the Framework Plan. However, because the proposed project would result in identified significant direct and cumulative unmitigated traffic impacts (see Chapter 4.B., Traffic Circulation) at some roadway and freeway segments, the Subarea

Plan would not fully implement the Framework Plan principle of developing a transportation system that avoids impacts at adjoining communities.

The development pattern, proposed intensity, and topographic alteration incorporated in Plan 1 would be generally consistent with that anticipated in the Framework Plan.

In terms of circulation, no significant traffic impacts have been identified that relate to the development intensity proposed by the Pacific Highlands Ranch Plan.

Subarea Plan 2. The two-18-acre difference between the MSCP open space acreage under Plans 1 and 2 is inconsequential and would not affect the conclusions stated above for Plan 1. Plan 2 would also be functionally equivalent to the adopted MSCP open space preserve design.

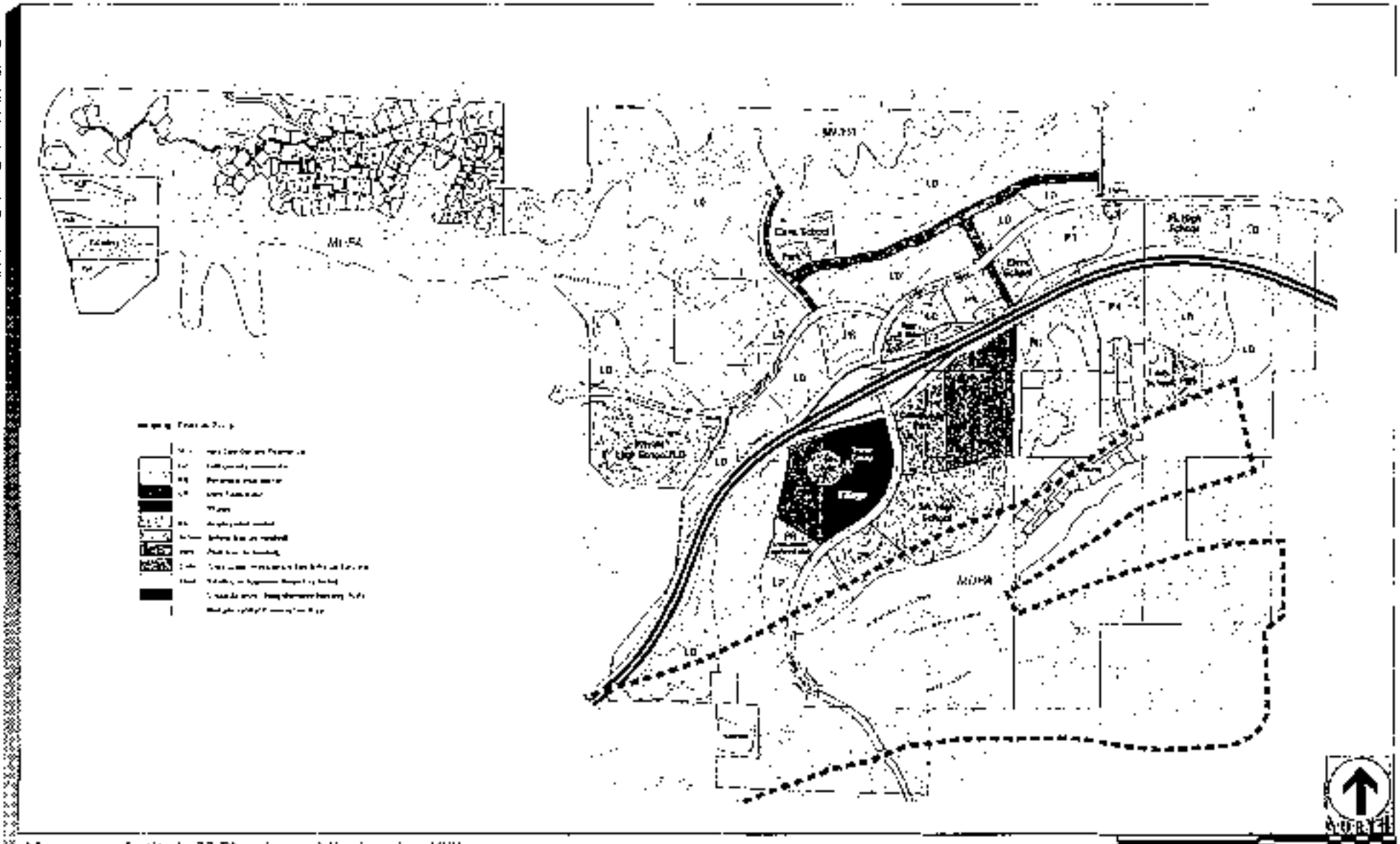
The primary difference with the Plan 2 alignment for SR-56 is that the western portion of SR-56 in Pacific Highlands Ranch would be located more northerly than in Plan 1 and the Carmel Valley Road/Camino Santa Fe link would be pushed towards the central portion of the subarea. The result is that the on/off ramps for SR-56/Carmel Valley Road/Camino Santa Fe exchange would avoid the north-south MSCP open space canyon on the western side of the subarea. To accommodate wildlife movement, bridging of the north-south open space canyon would still be required. However, this freeway bridge would be in much closer proximity (approximately 900 feet versus 4,000 feet) to the bridge on Del Mar Heights Road to the north (see Figure 3-2).

The development pattern and proposed intensity incorporated in Plan 2 for Pacific Highlands Ranch is also generally consistent with that anticipated in the Framework Plan and would not create adverse impacts.

c) Consistency with the Local Coastal Program

Subarea Plans 1 and 2. A comparison of Figures 4A-5 and 4A-6, which show the coastal zone boundaries, with the proposed plans indicates that most of the on-site coastal zone is within the proposed open space. Nearly all the proposed development will take place outside of the coastal zone. The only exceptions are a small area of low density residential at the eastern boundary in Plan 1 (see Figure 4A-5) and portions of low density residential, peripheral residential, and senior high school along the southernmost limits of the development area in Plan 2. In addition, the southern half of the approved and built 29-unit Rancho Glens Estates development along Caminito Mendiola in the interior of Pacific Highlands Ranch is located within the coastal zone (see discussion below).

The North City LCP designates all of the coastal zone within Pacific Highlands Ranch for open space and park uses, with the exception of the southwest corner of the site, west of



Map source: Latitude 33 Planning and Engineering 1998

2000 1000 FEET 0

Figure 4A-6

North County Local Coastal Zone
Subarea - Plan 2

the existing Carmel Valley Road, which is designated residential. The low density residential area at the southwestern corner shown under Plan 2 would be consistent with this designation. In addition, the low density residential shown near the eastern boundary south of SR 56 under both Plan 1 and Plan 2 and portions of the peripheral residential and senior high school within the coastal zone under Plan 2 would not be consistent with the LCP. The previously approved Rancho Glens Estates development is also located in an area of the coastal zone which was designated as open space in the North City LCP. However, a coastal development permit was obtained from the Coastal Commission prior to implementation of the project.

Both plans are considered to be consistent with the general LCP goals and objectives regarding the protection of significant wildlife habitat areas within the coastal zone, emphasis of Del Mar Heights Road as the major east/west link through the Carmel Valley, inclusion of a circulation plan which is designed to blend with the natural topography and complement adjacent land uses, and encouragement of alternative modes of transportation. The LCP does not specifically address transportation corridors through Pacific Highlands Ranch, other than to indicate that State Route 56 will be evaluated in the LCP when funding for this facility becomes available. An amendment to the LCP will be required in conjunction with approval of the proposed Pacific Highlands Ranch Plan, and SR-56, to incorporate the planned transportation corridors and any other land use variations from the existing LCP.

Significance of Impacts

Subarea Plans 1 and 2. Both proposed plans are generally consistent with the intent of the General Plan, environmental goals of the adopted NCFUA Framework Plan, Council Policy 600-40, and the North City LCP. The lack of compliance with the preservation of agricultural lands described in the Framework Plan, and the impacts to the circulation system represents a significant direct and cumulative land use impact.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. The No Project alternative would avoid impacts to the General Plan agricultural lands preservation goal, and the NCFUA circulation system principles.

2) Issue

Would the Pacific Highlands Ranch Plan result in a conflict with the purpose and intent of the Resource Protection Ordinance?

Impacts

Subarea Plans 1 and 2. Under current City of San Diego regulations, a RPO permit is not required for the Pacific Highlands Ranch Plan but would be needed for any subsequent development proposals. However, to comply with provisions of City Council Policy 600-40, a RPO analysis was prepared for the entire subarea to determine overall RPO consistency. This analysis is included as Appendix B to the EIR.

If the City Council approves the Pacific Highlands Ranch Subarea Plan as a long-range plan, Council Policy 600-40 allows the Planning Commission to make substantial conformity determinations pursuant to RPO and approve future proposed maps without making alternative compliance findings. Substantial conformance determinations for development proposals pursuant to a long-range plan constitute alternative compliance of RPO. If the City Council does not approve the subarea plan as a long-range plan, then the alternative compliance pursuant to RPO must be satisfied.

Steep Slopes—Pacific Highlands Ranch has approximately 369 acres (14 percent of the site) of sensitive hillsides (slopes in excess of 25 percent). Given this percentage of on-site steep slopes, the maximum allowable encroachment would be 7 percent or 25 acres. The proposed encroachments under Plan 1 (63.7 acres or 17.3 percent) and Plan 2 (70.4 acres or 19.1 percent) would exceed the allowances under RPO.

Biologically Sensitive Resources—Both Plan 1 and Plan 2 have been designed to comply with the MHPA and the requirements of the MSCP Subarea Plan (see Issue 5 below). The project would be functionally equivalent with the MHPA and would be consistent with the Development Regulations for Sensitive Biological Resources and Biology Guidelines (Section 101.0462.0026 of RPO). The proposed projects' compliance with the six components regarding biologically sensitive lands are listed below:

- Lands included in the MHPA—Encroachment into the MHPA is proposed under both Subarea Plans, but the plans provide for a MHPA preserve which is functionally equivalent and would enhance the long-term conservation of resources.

- Wetlands—Relatively minor impacts (i.e., less than three acres) to wetlands in conjunction with road crossing and limited development areas would occur under both plans. Mitigation is proposed which would reduce the direct biological impacts to below a level of significance, but not the cumulative impacts.

- Tier I, II, III habitats outside of the MHPA—Impacts to these Tier habitats would occur under both Subarea Plan 1 and Plan 2. These impacts are allowed pursuant to the MSCP and mitigation for the impacts would be provided. However, cumulative impacts to grasslands would remain significant.

- Land supporting rare, threatened, or endangered species Impacts to the coastal California gnatcatcher and Del Mar manzanita would occur, but mitigation for these impacts pursuant to the MSCP Subarea Plan is provided.

- Narrow endemics—Narrow endemic species as described in the MSCP Subarea Plan do not occur within Subarea III.

- Covered Species—Impacts to covered species are identified, but mitigation for these impacts pursuant to the MSCP Subarea Plan is provided.

Wetland and Wetland Buffers—Wetlands within Pacific Highlands Ranch are described based on the RPO definition which requires satisfaction of any one of the three parameters (vegetation, soils, or hydrology) to define a wetland. Wetland vegetation as shown in the Biology section of the EIR was used to define wetland areas. The identified wetlands on-site are in topographically defined drainages or agricultural impoundments and consist of southern willow scrub, mule fat scrub, and coastal and valley freshwater marsh (approximately 31 acres). Both subarea plan designs have been designed to avoid, minimize, and mitigate the wetland impacts. However, there would be a minimal encroachment into wetlands for road crossings and limited development areas under both Plans 1 and 2; approximately 2.6 acres under Plan 1 and 2.5 acres under Plan 2. Also, both plans incorporate wetland buffers on both sides of the Gonzales Canyon urban amenity corridor. Because wetland impacts would not be avoided as required in the development regulations under RPO, a deviation from the development regulations of RPO would be required. The deviation requirement process is identified in the ordinance. The wetland impacts, however, would comply with the requirements of the MSCP as described below in Issue 5.

Floodplains—The development footprint for Pacific Highlands Ranch would impact approximately 29.5 acres of floodplains as mapped by the federal government under Plan 1 and approximately 30.6 acres under Plan 2.

Significant Prehistoric Sites—The entire property has been inventoried and all cultural sites evaluated for significance under RPO. Chapter 4.F of this MEIR contains a detailed discussion of on-site cultural resources and the proposed data recovery mitigation measures. Because three of the sites within Pacific Highlands Ranch boundaries have been proposed for National Register Eligibility in conjunction with the SR-56 EIR (City of San Diego 1998) these sites are considered significant under RPO. Although data recovery has been proposed to adequately mitigate the impacts to these sites and the design of each subarea plan avoids the impacts to the extent feasible, preservation of RPO-significant sites is required under the provisions of the ordinance.

Significance of Impacts

Subarea Plans 1 and 2. Both subarea plans have been prepared consistent with the requirements of City Council Policy 600-40. However, both plans would not be consistent with the encroachment provision of RPO as they apply to steep slopes, wetlands, and significant prehistoric sites. As such, this would represent a significant direct and cumulative land use impact.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. Although both subarea plans have been designed to minimize impacts to RPO-sensitive resources, strict compliance with the development regulations of the ordinance would require a project redesign. The plans' inconsistency with the RPO encroachment provisions can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

3) Issue

Would the project result in a conflict with the purpose and intent of any current planning process or adopted environmental plans or policies for the area?

Impacts

a) Consistency with the San Dieguito River Regional Concept Plan

Subarea Plans 1 and 2. The planning area for the San Dieguito River Regional Concept Plan is adjacent to and north of Pacific Highlands Ranch. The recommended land uses and equestrian/hiking amenities in the regional plan are consistent with the residential and proposed MSCP open space land uses which are proposed in both Plan 1 and Plan 2.

b) Consistency with the San Dieguito River Regional Open Space Focused Planning Area

Subarea Plan 1. The San Dieguito River Valley Regional Open Space Park FPA would extend through Pacific Highlands Ranch along Gonzales Canyon and includes the bluffs above the canyon to the north. The FPA also extends into the northernmost portions of Pacific Highlands Ranch from the off-site La Zanja Canyon. Plan 1 would include a plan for a trail system within the open space system. The trail system would include hiking, biking, and equestrian trails that connect with pedestrian and bike paths within the built neighborhoods. The trails would be located within the proposed urban amenity areas.

Thus, Plan 1 for Pacific Highlands Ranch would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon.

Subarea Plan 2. Plan 2 also would include a trail system within the open space system. The trail system would connect with pedestrian and bike paths within the built neighborhoods. The trails would be located within the proposed biological buffer, transition zone, and urban amenity areas but would be prohibited from the habitat protection area, unless there were no other feasible alternatives. Thus, Plan 2 would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon.

Significance of Impacts

Subarea Plans 1 and 2. Both Plan 1 and 2 for Pacific Highlands Ranch would accommodate the trail system goals in the FPA, especially in the area of Gonzales Canyon. Therefore, they are considered consistent with the goals and objectives of the FPA.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. No mitigation would be required.

4) Issue

Would the project be compatible with existing and planned land uses in the project vicinity? Would the uses proposed within the subarea result in any internal land use conflicts?

Impacts

a) Compatibility with Existing Off-Site Land Uses

Subarea Plans 1 and 2. All commercial and office uses would be located in the Village in the interior of Pacific Highlands Ranch under both subarea plans and would not pose a land use compatibility problem for the existing residential land uses adjacent to the subarea. As described in the existing condition section above, both plans show predominantly open space uses adjacent to the subarea boundary, except for areas of very low density residential along the northern boundary and a very small area of low density residential land use at the eastern boundary. With the exception of the extension of Camino Santa Fe, there would be no development proposed for the southern boundary of the subarea. The proposed residential densities and MSCP open space uses along the

Pacific Highlands Ranch boundary would be generally compatible with the adjacent, off-site, existing open space, equestrian, agricultural, nursery, golf course, and estate single-family residential uses.

b) Compatibility with Planned Land Uses Surrounding Pacific Highlands Ranch

Subarea Plans 1 and 2. The planned land uses in Carmel Valley, Fairbanks Ranch, and San Dieguito (San Diego County) planning areas, which are immediately adjacent to Pacific Highlands Ranch, are all estate and single-family residential and open space uses. These uses would be considered compatible with the single-family residential and open space uses proposed within Pacific Highlands Ranch under both plans.

The planned land uses within Subareas IV and V of the NCFUA, which would be adjacent to Pacific Highlands Ranch, would include open space and single-family residential units. Subarea V uses include open space and residential uses, which would be compatible with the adjacent open space and residential uses proposed in Pacific Highlands Ranch. These uses are considered to be compatible with the single-family residential and open space uses proposed within Pacific Highlands Ranch under both plans.

c) Land Use Compatibility within Pacific Highlands Ranch

Subarea Plans 1 and 2. Land use compatibility impacts for the uses proposed within Pacific Highlands Ranch could occur in conjunction with aesthetic, noise, and traffic circulation interface between the uses. Within Pacific Highlands Ranch, the greatest potential for land use compatibility impacts would be within the Town Center and Village, where residential, commercial, high school, and office uses would coexist.

With respect to the Town Center and Village, both land use plans would provide transitions and buffers (e.g., roadways and landscaped grade separation) between the more intense uses in the Village and the adjacent peripheral residential, low density residential (Plan 2 only), and public high school uses. These buffering design concepts would avoid adverse land use compatibility impacts with the Village.

Another inherent potential land use compatibility issue associated with Pacific Highlands Ranch is the relationship of the various uses to the two SR-56 alignments. Irrespective of which alignment is approved by Caltrans for SR-56, there is a potential for land use compatibility impacts (i.e., adverse noise and aesthetic impacts) between the freeway and the existing and proposed uses within Pacific Highlands Ranch under both land use plans. This interface between the freeway and various residential development areas (proposed and existing Rancho Glens Estates), public high school, and the community park under both plans represents a potentially significant internal land use compatibility impact.

This freeway compatibility issue is also presented in the Revised Draft EIR for the middle segment of SR-56 (City of San Diego 1998). The SR-56 EIR identifies significant land use impacts for both freeway alignments, but concludes that the alignment associated with Plan 2 would result in greater impacts to planned land uses within Subarea III (City of San Diego 1998;4-140). The proposed employment center use adjacent to SR-56 under both Plan 1 and Plan 2 would be compatible with the freeway.

There is also the potential for land use compatibility impacts from a noise perspective due to the proximity of Del Mar Heights Road and Carmel Valley Road to adjacent residential, school, and park uses. These impacts are addressed further in Chapter 4.K, Noise, and are considered to be fully mitigable through sensitive site planning and the provision of noise attenuation measures.

Significance of Impacts

a) Compatibility with Existing Off-Site Land Uses

Subarea Plans 1 and 2. The interface of the proposed on-site uses under both land use plans for Pacific Highlands Ranch would not represent a significant land use compatibility impact with existing adjacent uses.

b) Compatibility with Planned Land Uses Surrounding Pacific Highlands Ranch

Subarea Plans 1 and 2. The interface of the proposed on-site uses under both land use plans for Pacific Highlands Ranch with the planned land uses on adjacent properties would not represent a significant land use compatibility impact.

c) Land Use Compatibility within Pacific Highlands Ranch

Subarea Plans 1 and 2. The identified potential internal land use compatibility impacts described above in conjunction with the SR-56 alignment are considered potentially significant. As noted above, the significance of this impact is also described in the Revised Draft EIR for the Middle Segment of SR-56. Also, the proposed extension of Carmel Valley Road could result in significant land use incompatibilities with the proposed Pacific Highlands Ranch residential developments along these roadways.

Mitigation, Monitoring, and Reporting

a) Compatibility with Existing Off-Site Land Uses

Subarea Plans 1 and 2. No mitigation would be required.

b) Compatibility with Planned Land Uses Surrounding Pacific Highlands Ranch

Subarea Plans 1 and 2. No mitigation would be required.

c) Land Use Compatibility within Pacific Highlands Ranch

Subarea Plans 1 and 2. Mitigation for the potential internal land use compatibility impacts associated with proposed land uses and the SR-56 freeway would consist of the requirement for landscaping and noise attenuation measures at the time tentative maps are processed.

5) Issue

How is the project consistent with the City of San Diego's Multiple Species Conservation Program (MSCP) Subarea Plan?

Impacts

The MSCP requires changes to the NCFUA Framework Plan that result in an increase in the size of the Environmental Tier area through the deletion of development acreage. Most of the changes, as expressed by the adopted MHPA, are located in Pacific Highlands Ranch. Consequently, the MSCP (adopted in 1997) supersedes the Framework Plan and acknowledges the decreases in developable areas within the subarea by adoption of the MHPA boundaries. Resources being protected through inclusion in the MHPA will be monitored and managed by the City to ensure their viability over the long term. Following is a discussion of the proposed Pacific Highlands Ranch site plans consistency with the approved MSCP.

a) Uses Allowed in the MHPA Preserve

Section 1.4.1 of the MSCP Subarea Plan lists the following land uses and activities considered conditionally compatible with the biological objectives of the MSCP and consequently allowed within the MHPA:

- Passive recreation
- Utility lines and roads in compliance with General Planning Policies and Design Guidelines discussed below.
- Limited water facilities and other essential public facilities.
- Limited low density residential uses.

- Brush Management (Zones 2 and 3).
- Limited Agriculture.

Development within the MHPA in Pacific Highlands Ranch on parcels that are wholly within the MHPA, must be consistent with the above uses. Development on such parcels would be limited to 25 percent of the parcel, be located in the least sensitive areas of the parcel and would proceed in conformance with the A-1-10 zone. Any public facilities located within the MHPA would be sited to minimize impacts to large populations of MSCP-covered plants, and revegetation disturbed areas would be required.

Both Subarea Plan 1 and Plan 2 propose only low-density residential, passive recreational, public, circulation, and brush management uses inside the MHPA. Development under either plan would not exceed 25 percent of the parcel. Some of the disturbed agricultural lands within the MHPA would be available for enhancement and restoration by project proponents needing mitigation credits or by government agencies in order to contribute to the functioning of the MHPA. Thus, the resultant development of Pacific Highlands Ranch is consistent with the permitted uses within the MHPA.

b) Relationship to the MSCP Preserve Area

As shown in Figures 4A-7 and 4A-8, approximately 1,510 acres of Pacific Highlands Ranch is within the MHPA of the MSCP. Although Subarea Plans 1 and 2 would encroach into the MHPA, both plans have been deemed functionally equivalent with the MHPA as proposed in the MSCP. As described in the Project Description section of this EIR, the proposed development area for both plans has been expanded into the defined MHPA open space boundary by approximately 161.4~~149.5~~ and 230.5~~212~~ acres, respectively. The expansion into the MHPA was necessary to accommodate the realignment of SR-56 into the development area of Pacific Highlands Ranch. As discussed in the Biology section of this EIR, the impacts of this expansion are not significant. The negative impacts associated with location of SR-56 within the MHPA are largely eliminated by the realignment into the development area. This expansion has been accepted by ~~the~~ numerous interested conservation and planning groups. Meetings and site visits were held in 1997 and 1998 with these groups (e.g., Sierra Club, Carmel Valley Community Planning Board, the City, state and federal resource agencies, and the Endangered Habitats League), and a site design was developed which accommodated regional biological conservation goals.

As noted in the Project Description and shown in Figure 3-5 and 3-6, the MHPA boundary would also be adjusted at locations outside of Pacific Highlands Ranch. Specifically, the MHPA boundary within Carmel Valley Neighborhoods 8A and 10 would be modified. Within Neighborhood 10, the minor adjustment would result in net removal of approximately 8.4~~4~~ acres of Tier II and Tier III habitats (coastal sage scrub

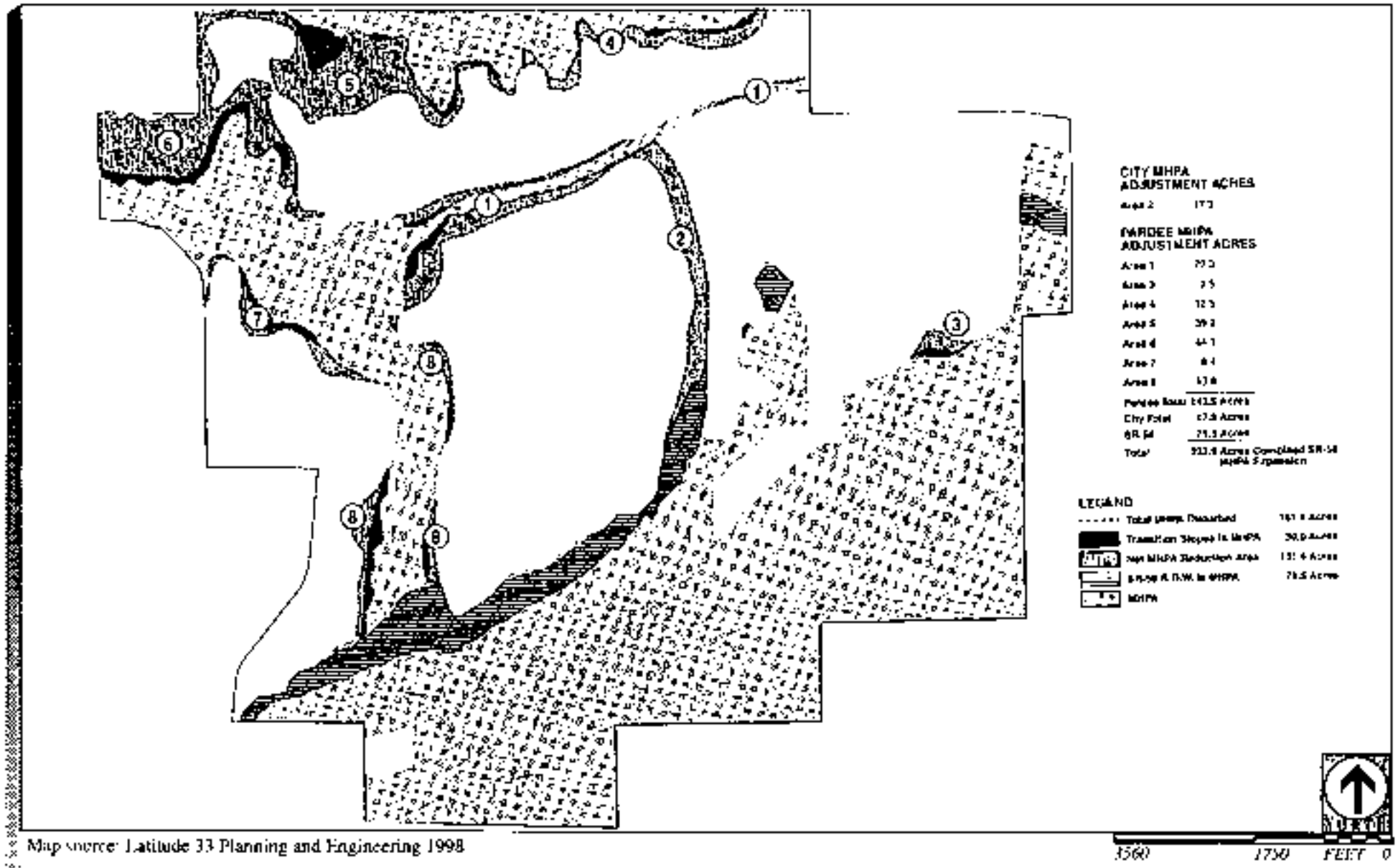


Figure 4A-7

Relationship of MSCP Preserve to Subarea Plan1

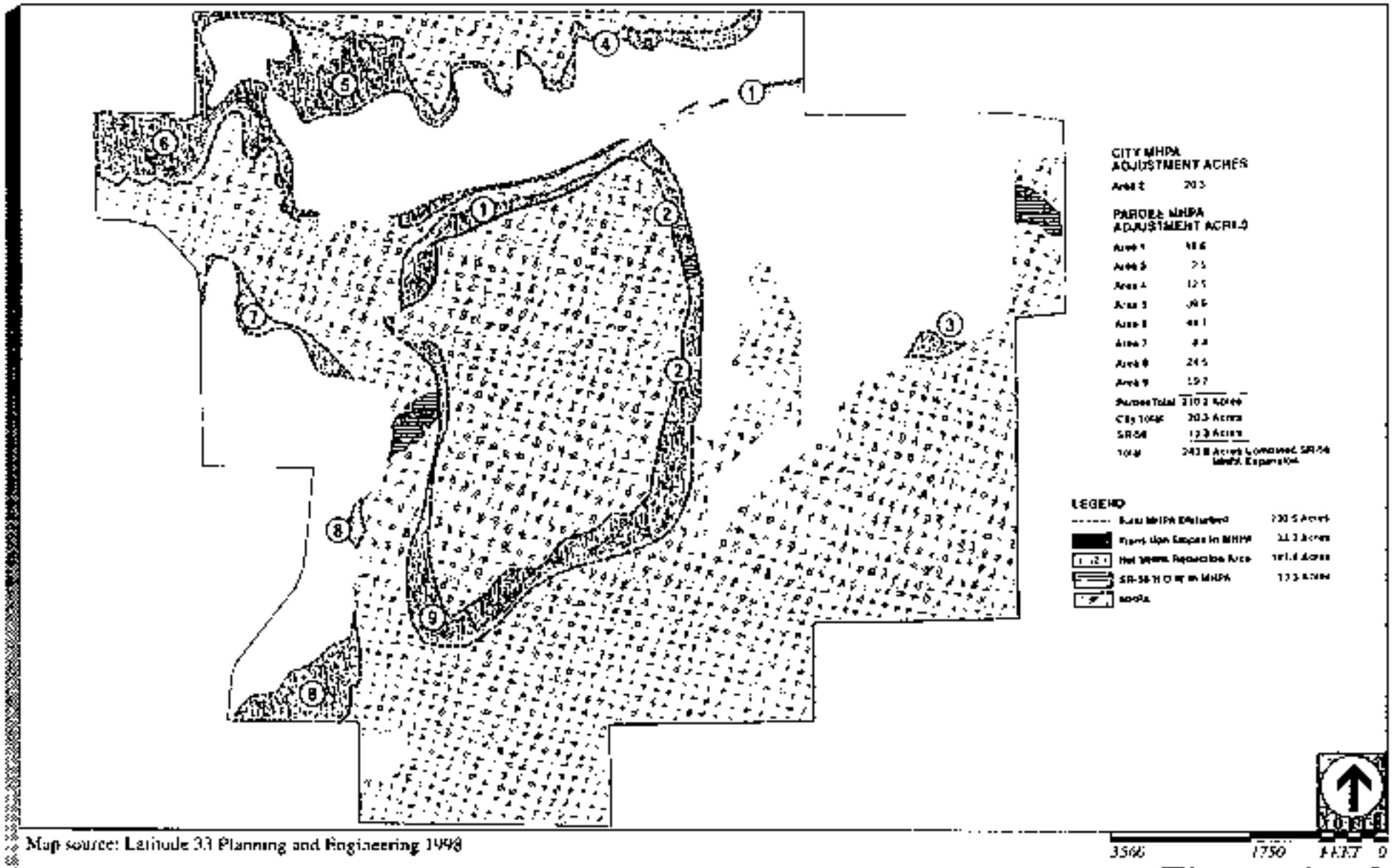


Figure 4A-8

Relationship of MSCP Preserve to Subarea Plan2

and grasslands). The land being removed from the MHPA is not within a wildlife corridor and is within a central east-west canyon which has approved development on three sides. This area is not part of a large contiguous block of undisturbed habitat. This modification would not affect the function of the preserve in Neighborhood 10.

At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 150 acres would be conveyed by Pardee of which 55 acres of Tier I habitat would be added to the MHPA. An additional 20 acres within Parcel A may be added to the MHPA in the future should the City decide not to use this acreage for school/park uses. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. The addition of a relatively large block of mostly Tier I habitat within Carmel Valley Neighborhood 8A would result in a MHPA that would be functionally equivalent superior to that shown in the MSCP Subarea Plan.

Overall, the reduction in the MHPA in both Pacific Highlands Ranch (described for each Subarea Plan below) and Carmel Valley Neighborhood 10 is offset by increases to the MHPA in Carmel Valley Neighborhood 8A and the NCFUA Subarea V (Deer Canyon parcel). The proposed adjustment areas would result remove largely disturbed land from the MHPA (Pacific Highlands Ranch and Carmel Valley Neighborhood 10), increase the preservation of rare Tier I resources (Carmel Valley Neighborhood 8A Parcels A and B), and remove the potential for development within the MHPA (15 acres within Subarea V Deer Canyon parcel and 75 acres within Neighborhood 8A).

Finally, Pardee Homes has agreed to other provisions which would further enhance the MHPA function. These measures consist of the following:

1. No brush management activities would be performed within the preserve along the edges of several of the proposed encroachment areas.

2. All manufactured slopes along the edge of the MHPA would be included within the MHPA and would be revegetated in accordance with a master revegetation plan.

3. Impacts to wetlands would be minimized, and mitigation if necessary would be per City Ordinance and the U.S. Army Corps of Engineers 404 Permit requirements.

4. Approximately 100 acres of disturbed land within the MHPA for Pacific Highlands Ranch would be restored per a master revegetation plan with appropriate upland and wetland habitats and a mitigation bank established. Much of this revegetation area consists of a manufactured wildlife corridor that would connect and provide for wildlife movement between Gonzales Canyon and McGonigle Canyon.

5. Conveyance of habitat within Carmel Valley Neighborhood 8A and Subarea V (Deer Canyon).

Subarea Plan I. Under Subarea Plan I, approximately 1,280 acres would be set aside as dedicated MHPA open space, 20 acres for urban amenity uses, and ~~30~~ 24 acres of active use open space (includes parks and schools). Subarea Plan I proposed development would encroach about 161.4~~149.9~~ acres into the MHPA that was adopted in the MSCP Subarea Plan. Pacific Highlands Ranch is part of the total 52,000-acre MHPA. This encroachment includes the following areas:

1. Adjacent to existing development in Gonzales Canyon in the northwestern portion of Pacific Highlands Ranch to be developed for low-density residential uses;

2. At the edge of south-facing slopes adjacent to existing agricultural fields in the upper reaches of Gonzales Canyon;

3. For the proposed park and urban amenity areas in the upper reaches of Gonzales Canyon;

4. On both sides of the north-south corridor between Gonzales Canyon and McGonigle and Deer Canyons; and

5. On the south-facing slopes in the upper reaches of McGonigle Canyon would be encroached for development of the elementary school site and low-density residential uses.

While the natural open space system proposed under Subarea Plan I would be approximately 6 percent smaller than that proposed by the MSCP, it would establish a system of wildlife corridors and habitat areas that would successfully function in the same manner as that proposed by the MSCP and would eliminate much of the habitat fragmentation that would otherwise have resulted from SR-56 being within the MHPA as shown in the Framework Plan. The on-site open space system would preserve the habitats and major wildlife corridors south of SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide the required northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. Gonzales Canyon leads out of the subarea westerly through the Del Mar Highlands Estates PRD property and drains into the San Dieguito River valley. This north-south corridor between McGonigle and

Gonzales Canyons is currently disturbed grasslands and requires grading and revegetation to function as part of the regional wildlife preserve system. Upon completion, this new linkage would be approximately 600 feet to 900 feet wide, and will be approximately 4,000 feet long. The minimum wildlife corridor widths at the northwest along Gonzales Canyon and at the southeast at McGonigle Canyon would be 1,000 feet.

In order to facilitate wildlife movement, bridges would be located where Del Mar Heights Road and SR-56 cross the north-south corridor that connects McGonigle Canyon and Gonzales Canyon, and where SR-56 and Camino Santa Fe Road cross McGonigle and Deer Canyons. Culverts would be used in other locations along both Del Mar Heights Road and SR-56 to cross canyons that are not located within the MHPA. ~~Undercrossings (i.e., wildlife culverts) would be beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement.~~ The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also be a component of the natural open space system. Thus, the proposed open space system is considered functionally equivalent with the MHPA as proposed in the MSCP, requiring only an amendment to the adopted MHPA boundaries.

Subarea Plan 2. Under Subarea Plan 1, approximately 1,2958 acres would be set aside as dedicated MHPA open space, 20 acres for urban amenity uses, and 30 acres of active use open space (includes parks and schools). Subarea Plan 2 proposed development would encroach about 230.5212 acres into the approximate 1,510 acres (amounts to 15 percent of the MHPA within Pacific Highlands Ranch) proposed by the MSCP for the MHPA. This plan would also require an amendment of the adopted MHPA boundaries. This encroachment includes the following:

1. Adjacent to existing development in Gonzales Canyon in the northwestern portion of Pacific Highlands Ranch to be developed for low-density residential uses;

2. At the edge of south-facing slopes adjacent to existing agricultural fields in the upper reaches of Gonzales Canyon;

3. For the proposed park and urban amenity areas in the upper reaches of Gonzales Canyon.

4. On both sides of the north-south corridor between Gonzales Canyon and McGonigle and Deer Canyons;

5. On the south-facing slopes in the upper reaches of McGonigle Canyon for development of the elementary school site and low density residential uses;

6. In the southeast corner of the subarea for low density residential uses; and,

7. On the north side of McGonigle Canyon for low-density residential uses, peripheral residential uses, and for a senior high school site.

As with Subarea Plan 1, Subarea Plan 2 maintains the system of wildlife corridors and habitat areas that are critical to the successful function of the MSCP. The additional encroachment areas under Subarea Plan 2 are mostly within lands previously disked for agriculture. The proposed open space system proposed under this subarea plan is also considered functionally equivalent to the MHPA as proposed by the MSCP.

c) MSCP Functional Equivalency

Subarea Plans 1 and 2. The adopted MSCP allows adjustments to the MHPA if the adjustment will result in the same or higher biological value for the preserve. The comparison of biological value is to be based on certain factors which are discussed below. The proposed Pacific Highlands Ranch adjustments for either Subarea Plan 1 or 2 meets all of these factors in light of the boundary adjustment components discussed above. The factors include the following:

1. Effects on significantly conserved habitats: The adjustment will maintain the status of conserved habitats through implementation of the MSCP ratios identified in the Biology Guidelines. The reduction of disturbed/agricultural habitat in Pacific Highlands Ranch would be compensated through the conservation of largely Tier I habitats within Neighborhood 8A.

2. Effects on covered species: The adjustment does not affect any large populations of covered species.

3. Effects on habitat linkages and function of preserve areas: The adjustment maintains affected natural linkages at a minimum width of 1,000 feet, and provides a large block of habitat within the middle of a major linkage (i.e., Gonzales Canyon) to allow breeding, foraging and other natural life functions to exist in the linkage.

4. Effects on preserve configuration and management: The adjustment generally either maintains the shape and size, or increases the size of the preserve as shown in the City's MSCP Subarea Plan, and will not affect either configuration or the necessary level of management.

5. Effects on ecotones or other conditions affecting species diversity: The adjustment conserves all blocks of large habitat shown in the MHPA in the City's Subarea Plan.

6. Effects to species of concern not on the MSCP-covered species list: The adjustment does not affect known populations of other species that might be considered sensitive in the city of San Diego.

The addition of approximately 75 acres of largely Tier 1 habitat to the MHPA in Carmel Valley Neighborhood 8A will greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that the scarce botanical resources associated with southern maritime chaparral will be maintained over the long term. The deletion of approximately 15 acres of land with development potential within the MHPA at Subarea V (Deer Canyon parcel), revegetation of wetlands and movement corridors, and elimination of brush management within certain areas of the MHPA all contribute to the establishment of a MHPA in the North City area that is functionally equivalent~~superior~~ to that shown in the MSCP Subarea Plan.

d) Consistency with MSCP Northern Subarea Plan Guidelines

The MSCP Subarea Plan includes specific guidelines for the NCFUA that must be incorporated into the NCFUA in order for the MHPA to function properly, and for the City's take authorizations to be valid. As described above, four guidelines are applicable to development within Pacific Highlands Ranch. It follows:

- C 12 Incorporate bridges to facilitate wildlife crossings (Gonzales and McGonigle Canyon areas).

Both Subarea Plans 1 and 2 would accommodate these provisions for wildlife movement through the subarea. Two bridge-span road crossings to allow wildlife movement from the south (McGonigle and Deer Canyon areas) to the north (Gonzales Canyon area) have been incorporated into both Plan 1 and 2 for the subarea. In addition, Del Mar Heights Road would ~~include wildlife undercrossing culverts~~ be bridged to accommodate the north/south movement from Carmel Valley to Gonzales Canyon.

- C 14 Provide fences or barriers along the edges of the shallow north-south trending canyon that connects Carmel Valley to Gonzales Canyon to direct public access to appropriate locations.

Both Subarea Plans 1 and 2 would accommodate these fencing provisions within the major wildlife corridor connecting Carmel Valley with Gonzales Canyon. No trails would be located within this corridor and fencing of the low-density residential development of the west side of the corridor is included in the Pacific Highlands Ranch

Subarea Plan. Each future development project within Subarea III would be required to address the dimensions and type of fencing and barrier located along either side of the north/south-trending canyon that connects McGonigle Canyon to Gonzales Canyon.

- C 17 If this area develops or redevelops, the MHPA boundary should be accommodated with the majority of the floodplain to be placed in open space and restored where possible to natural habitats.

Both Subarea Plans 1 and 2 would avoid impacts to the majority of floodplains (i.e., Gonzales Canyon and McGonigle Canyon) as these areas would either be part of the MHPA or within the urban amenity open space.

- C 19 In the event that the MHPA configuration is not implemented pursuant to the "Pardee Settlement Agreement," then the MHPA configuration shall be per the NCFUA Framework Plan. Provide an undercrossing of San Dieguito Road for wildlife movement from Gonzales Canyon of the San Dieguito River.

Both Subarea Plans 1 and 2 have been designed to conform with the configuration as described in the Pardee Settlement Agreement.

c) Compliance with MHPA Planning Policies and Design Guidelines

Section 1.4.2 of the MSCP Subarea Plan includes general planning policies and design that are to be used in the planning of projects located adjacent to or within the MHPA. These policies and guidelines address the construction of roads and utilities; fencing, lighting, signage; materials storage, mining/extraction/processing facilities, and flood control. These topics as they relate to Pacific Highlands Ranch site plans are addressed below.

The backbone circulation element road system, roads connecting development areas with major roads, and utilities (water, sewer, electrical) are included in both Plans 1 and 2 for the subarea. The grading envelopes, rights-of-way and easements have been identified and any losses of sensitive habitat have been identified and incorporated into mitigation commitments. Two bridge-span crossings of wildlife corridors are within the preserve area are also included. The remaining local streets and utilities to serve future development would be located within the designated development envelopes and would not impact preserve areas.

Any fencing along property boundaries facing the open space corridors should be designed and constructed of materials that are compatible with the open space corridors.

Lighting of parking and outdoor areas is to be at a minimum intensity required for safety, the light source directed downward and shielded so as to avoid intrusion into the preserve

and adverse effects on wildlife. These design restrictions would be included in all future residential development fronting the preserve areas. Signage proposed for the subarea would be limited to specified uses. These uses generally would include access points, litter control, and for educational purposes.

Storage or use of potentially hazardous or toxic chemicals within the preserve area would not occur in the subarea.

Three major drainage areas located in Pacific Highlands Ranch (Gonzales, McGonigle, and Deer Canyons) are within the preserve areas and have established floodways. A small portion of the subarea drains northward into La Zanja Canyon. No flood control structures or features are proposed for the creek systems in the Pacific Highlands Ranch Plan. Both SR-56 alignments will cross a tributary to Carmel Valley Creek with bridge spans. Del Mar Heights Road will cross the same tributary with a bridge span as well. Impacts to any jurisdictional waters or wetlands will be reviewed and appropriate mitigation measures approved by the U.S. Army Corps of Engineers, California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the City of San Diego.

f) Land Use Adjacency Guidelines

Section 1.4.3 of the MSCP Subarea Plan includes guidelines that all land uses adjacent to the MHPA will be managed to "ensure minimal impacts to the MHPA." The Pacific Highlands Ranch site plans will implement these guidelines as follows:

Drainage

Both Plan 1 and 2 for the subarea include detention and desilting basins to retain runoff from developed areas. The basins would be located in the appropriate locations to collect runoff flowing to Gonzales Creek and in the southern portion to collect runoff flowing into the McGonigle and Deer Canyon drainages. Other Best Management Practices would be used to control runoff into the preserve.

Toxics

The MSCP Subarea Plan states that land uses, such as recreation and agriculture, that use chemicals or generate by-products that are potentially toxic or impactive to sensitive plants and animals that live in the MHPA should incorporate measures to reduce impacts caused by the application and/or drainage of such materials into the MHPA. Within Pacific Highlands Ranch, such measures may include detention basins, grass swales, or mechanical trapping devices to be used as appropriate. These systems will be inspected yearly and replaced or repaired as needed. Removal of exotic plants, sediment or other routine maintenance would not require any permits or permissions.

Lighting

As discussed above, lighting of parking and outdoor areas would be at a minimum intensity required for safety, the light source directed downward and shielded so as to avoid intrusion into the preserve and adverse effects on wildlife.

Noise

The primary source of noise generation in the subarea will be from major road traffic. Noise from major roads is anticipated to be below 65 decibels community noise equivalent level (dB CNEL) within 150 feet of the road edge crossing the preserve areas. The only uses adjoining the preserve would be residential which is not anticipated to generate chronic noise impacts to wildlife. Restrictions for noise impacts on grading and construction of lands adjacent to the MHPA consistent with the MSCP Subarea Plan would be implemented during the gnatcatcher breeding season. Grading inside the MHPA preserve or within 100 feet of the MHPA is prohibited during gnatcatcher breeding season. Grading outside these areas may proceed year round.

Barriers

Any permanent fencing along property boundaries facing the open space corridors should be designed and constructed of materials that are compatible with the open space corridors. Temporary fencing could be implemented within the preserve to protect native plant revegetation and restoration.

Invasive Species

Both Plans 1 and 2 for the subarea have a listing of appropriate landscape plantings for residences and in Amenity open space that restrict non-native plant species. Similar landscape guidelines would be included in proposals for future development within Pacific Highlands Ranch.

Brush Management

Brush management zone 1 would be located on the development pad and outside the MHPA. Zone 2 would be included within the MHPA. Both Subarea Plans (1 and 2) would locate Brush Management Zone 2 within the MHPA. Brush management plans for these areas would be required when development entitlements are applied for.

Grading/Land Development

The MSCP Subarea Plan states that manufactured slopes associated with site development shall be included within the development footprint for projects within or adjacent to the MHPA. All development proposed for Pacific Highlands Ranch would be done according to this condition.

g) Compliance with MHPA Management Recommendations

The MSCP Subarea Plan recognizes that management of the MHPA is critical to the overall success of the MSCP program, and that it must be done in a comprehensive fashion over the entire MHPA. The City MSCP subarea Plan states that the City will be responsible for and will continue the management and maintenance of its existing public lands at current levels. Lands obtained as mitigation through dedication or easement are include in the City's management responsibilities.

The MSCP Subarea Plan establishes both general and specific management priorities to be implemented when funding is available, although some may be implemented as development mitigation or through research efforts by the scientific and academic community. Both the general and specific management directives are prioritized with the first level of directives being required under the terms of the City's MSCP Implementing Agreement. Second and third priorities are more discretionary.

1. **General Management Directives.** These general directives apply to the entire preserve throughout the city. They address city-wide issues such as public access, trash removal, control of invasive exotics, and flood control.

2. **Specific Management Directives.** These are specific to Subarea III and address trail locations and requirements, coastal sage scrub monitoring, and specific requirements for fencing and detention basins and revegetation. These directives are also prioritized.

Those portions of the MHPA that are within Pacific Highlands Ranch would be dedicated to the City as development occurs. This is described in more detail in the Subarea Plan as is the relationship between MHPA conveyance and third-party beneficiary status. It is anticipated that the general Priority 1 management directives listed in the MSCP Subarea Plan and discussed below would be carried out by the City as agreed in the MSCP Implementing Agreement. Landowners within Pacific Highlands Ranch would not be responsible for any of the General Management Directives, and the City of San Diego would be responsible for management of lands conserved via dedication or the establishment of a conservation easement. A Habitat Management Plan would be prepared by the project applicant for lands dedicated as part of the MHPA and incorporated into the Subarea Plan. The plan would be implemented by the City.

Each of these priorities and their implementation by the proposed Pacific Highlands Ranch plans are discussed below:

Priority 1 Directive

1. Establish primary trail connections for equestrian and bicycle uses between Gonzales Canyon and Carmel Valley/McGonigle Canyon through or adjacent to

the more active, narrow linkage referred to as "Urban/Natural Amenity" in the Framework Plan.

Both Subarea Plans 1 and 2 accomplish this priority goal. Plan 1 includes a trail system within the open space system. The trail system includes hiking, biking, and equestrian trails that connect with pedestrian and bike paths within the built neighborhoods. One "Urban/Natural Amenity" area is located within the north-central portions of the subarea. This area is connected to Gonzales Canyon and is designed to connect with the southern portion of the subarea. Plan 2 also includes a trail system within open space and one "Urban/Natural Amenity" area which connects Gonzales Canyon with McGonigle and Deer Canyons.

Priority 2 Directives

1. Limit trails to the north side of the floodplain, adjacent to existing and proposed development in McGonigle Canyon, due to the physical constraints of the canyon for wildlife movement. Native plantings at the edges of the trail are desirable to shield the trail from both the development and the wildlife corridor area.

2. Provide fences or barriers along the edges of the shallow north/south-trending canyon that connects Carmel Valley to Gonzales Canyon to direct public access to appropriate locations. A trail on one side (only) of the canyon adjacent to development is preferred to a trail in the bottom of the canyon so that it does not obstruct animal movement. If a trail is placed inside this canyon, it should be limited to day use by pedestrians.

   Both Subarea Plans 1 and 2 include a trail system which utilizes the north side of the McGonigle Canyon floodplain and the north-south trending Neighborhood Parkway between McGonigle Canyon and the Urban Amenity in Gonzales Canyon. Animals will not be restricted from using the bottoms of the canyons.

3. Monitor the coastal sage scrub areas in Gonzales Canyon for degradation and take necessary steps to halt and restore degrading areas. Design detention basins planned or constructed for development projects along Gonzales Canyon as natural basins. Clearly demarcate equestrian trails through this area.

   Only natural detention basins will be constructed in Gonzales Canyon. All equestrian trails in the subarea will be clearly marked. Monitoring of coastal sage scrub is expected to be done by the City as part of the overall monitoring of the MSCP preserve.

Priority 3 Directives

Priority 3 includes five directives. The first is to restore disturbed areas to the appropriate native habitat over the long term, with riparian woodland species in the canyon bottoms, coastal sage scrub on south- and west-facing slopes, and chaparral on north-facing slopes within the Carmel Creek area, and McGonigle and Deer Canyons. The second is to remove eucalyptus trees and other invasive non-native species from the Preserve over the long term and replace them with native species. The third is to restore riparian trees and shrubs where McGonigle Canyon narrows due to the existing Rancho Glens Estates development. The fourth includes restoration of the Gonzales Canyon and the north/south-trending canyon that connects Carmel Valley to Gonzales Canyon to riparian, coastal sage scrub, and maritime chaparral habitats, as appropriate. And, finally, the fifth is to investigate the possibility of restoring the Gonzales Canyon floodplain to riparian woodland; to initiate cowbird trapping to prevent parasitism of gnatcatcher and other songbird nests; and to use natural detention basins in this area.

Revegetation, restoration, and cowbird trapping are all expected to be done by the City or other public agency as part of the overall management of the MSCP preserve, and as funds become available. Any detention basins that are necessary to control runoff and protect biologic and hydrologic resources will be allowed in the MHPA as will their routine cleaning.

NCFUA Framework Plan Management Concerns

Specific to the NCFUA, the MSCP Subarea Plan also incorporates Sections 5.4 and 5.5 of the Framework Plan, which address management concerns. The implementing principles cited in these sections address the management and enhancement of Environmental Tier lands and the location of roads in and adjacent to the Environmental Tier. The MSCP enlarges and improves upon the configuration of the Environmental Tier through the creation of the MHPA. As noted in the Pacific Highlands Ranch Plan, Section 5.4 and 5.5 were generally addressed and complied with. The exception is Section 5.4.a, requiring buffer zones and transition zones. Such zones are not required in the MSCP which enlarges and improves the old Environmental Tier.

h) Covered Species Special Conditions

Special management conditions apply for individual MSCP-covered species that occur within Pacific Highlands Ranch. These special conditions are identified below and discussed in more detail in the Biological Resources section of the MEIR.

Four MSCP-covered plant species occur within Pacific Highlands Ranch: Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), coast barrel cactus (*Ferocactus viridescens*), San Diego golden star (*Muilla clevelandii*), and wart-stemmed ceonothus (*Ceanothus verrucosus*) for which area special management conditions apply. These

include minimization of edge effects (all), minimization of recreational use impacts (manzanita and ceanothus), fire management, and prohibition of~~ing~~ collection ~~and fire management~~ (coast barrel cactus). These plants all occur within preserve areas that are to be deeded to the City of San Diego or the San Dieguito River Park Joint Powers Authority for long-term management.

One reptile species, the orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*), was observed within the subarea. Management actions directed to this species include using drought-tolerant plantings, restoration of coastal sage scrub, and discouraging frequent irrigation within and around the perimeter of the preserve and minimizing edge effects.

Two species of birds covered by the MSCP were observed: southern California rufous-crowned sparrow (*Aimophilia ruficeps canescens*) and the California gnatcatcher (*Polioptila californica californica*). Of concern for each is avoidance of active nests and maintenance and/or restoration/revegetation of coastal sage scrub habitat. Any specific management conditions apply inside the MHPA and will be carried out by the City as part of the overall management of the MSCP. Specifically, restrictions for noise impacts on grading and construction of lands adjacent to the MHPA consistent with the MSCP Subarea Plan would be implemented during the gnatcatcher breeding season. Grading inside the MHPA preserve or within 100 feet of the MHPA is prohibited during gnatcatcher breeding season. Grading outside the MHPA is allowed year round.

Significance of Impacts

The Pacific Highlands Ranch Plan would provide for a preserve area that is functionally equivalent with the MHPA proposed in the adopted MSCP. No significant adverse effects to MSCP implementation would result through implementation of either Subarea Plan.

Mitigation, Monitoring, and Reporting

No mitigation would be required.

B. Traffic Circulation

The following discussion is based on the transportation analysis for the Future Urbanizing Subarea III prepared by Urban Systems Associates, Inc. (USA) in March 1998. The report is included as Appendix B.

Existing Conditions

Pacific Highlands Ranch consists of approximately 2,652 acres located in the northwestern portion of the city of San Diego, approximately one mile east of the city of Del Mar (see Figure 2-1). Generally, Pacific Highlands Ranch lies between I-5 and I-15 in the North City Future Urbanizing Area. Because the subarea is generally undeveloped, existing access to the site is minimal. Carmel Valley Road connects with Black Mountain Road to bisect the site in a southwest to the northeast direction and several small collector streets access residences and nurseries in the eastern portion of the subarea.

a) Regulatory Requirements

Proposed projects in the city of San Diego which generate long-term traffic are subject to applicable requirements of the San Diego County Congestion Management Program (CMP) and the City of San Diego Traffic Impact Study Manual.

The San Diego County CMP was developed by the San Diego Association of Governments (SANDAG) in response to California Proposition 111 (approved in June 1990) and is intended to directly link land use, transportation, and air quality through level of service performance criteria. The San Diego County CMP requires a detailed analysis of potential transportation-related impacts for all projects which generate more than 2,400 total average daily traffic (ADT) or 200 peak hour trips.

The City of San Diego Traffic Impact Study Manual requires analysis of potential transportation-related impacts based on conformance with applicable community plan land use and transportation elements, as well as associated trip generation. Specifically, projects which conform with the noted elements and generate more than 2,400 ADT or 200 peak hour trips (based on driveway rates) are required to conduct a traffic impact study. Projects which do not conform to local land use and transportation elements and generate more than 1,000 ADT (based on driveway rates) are also required to prepare a traffic impact study, with similar criteria as noted above for determining computer modeling requirements. If a project exceeds these thresholds and the cumulative traffic impacts of the project also exceed 2,400 ADT or 200 peak hour trips, then the traffic study must incorporate computer modeling, pursuant to City guidelines.

b) Existing Street Segment Levels of Service

Street system operating conditions are typically described in terms of level of service (LOS). LOS is expressed as a letter designation from A to F, with A representing the best operating conditions and F the worst. LOS "A" through "C" represent free flowing traffic, conditions with little or no delay. LOS "D" represents limited congestion and some delay; however, the duration of periods of delay are generally acceptable to most people. City of San Diego Traffic Manual states "The acceptable level of service standard for roadways and intersections in San Diego is level of service D."

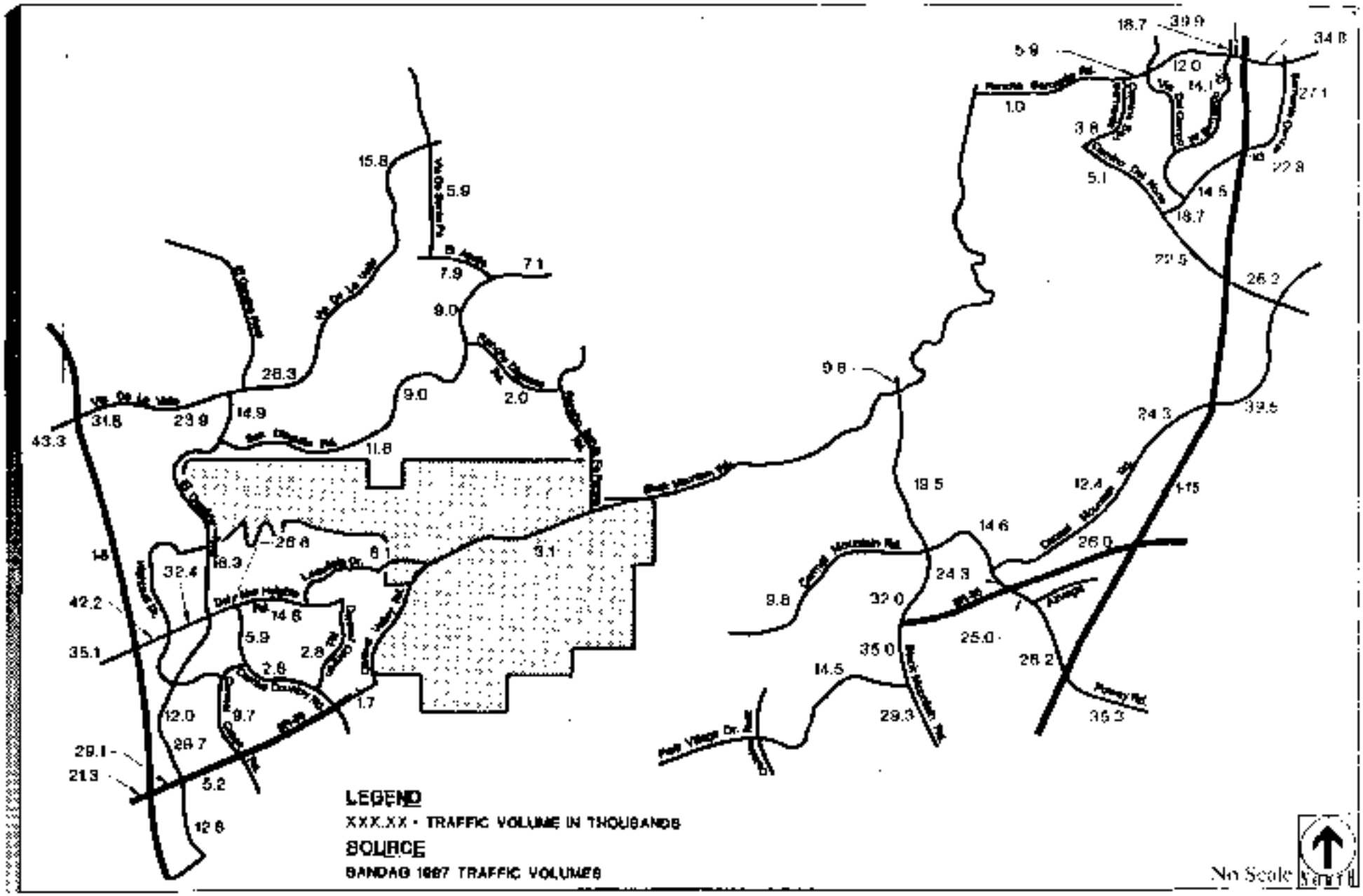
Figure 4B-1 depicts the existing circulation system, including the average daily traffic volumes, within the project area. Table 4B-1 gives an inventory of the existing roadway conditions. The source for existing street segment traffic volumes is SANDAG's *Book of Average Weekday Traffic Volumes* for years 1992-1996, dated May 1997. The SANDAG book is a compilation of current City, County, and State highway/freeway traffic volumes. Tables 4B-2 and 4B-3 give average daily vehicle trip thresholds corresponding to levels of service A through F for the various street classifications in the City and County of San Diego. Existing daily traffic volumes were evaluated against the applicable traffic volume thresholds to determine street segment LOS which are shown in Table 4B-4. The following segments were found to be operating below LOS D, i.e., E or F:

- Rancho Bernardo Road between West Bernardo Drive and Interstate 15
- El Camino Real between Via de la Valle and San Dieguito Road
- San Dieguito Road between El Camino Real and Rancho Dieguito Road
- Via de la Valle between San Andres and Via de Santa Fe (three segments)

c) Existing Peak Hour Conditions at Area Intersections

Existing peak hour operating conditions were evaluated for critical existing intersections. Table 4B-5 lists each intersection and its AM and PM peak hour LOS. Morning and afternoon peak hour volumes were obtained from the Black Mountain Ranch Subarea Traffic Impact Analysis dated November 1997. The intersection count data is included in Appendix B.

The Black Mountain Road/Park Village Road (#55) intersection currently operates at LOS E or F during the AM peak hour.



Source: Urban Systems 1997

FIGURE 4B-1
Existing Circulation System

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TABLE 4B-1

EXISTING AREA ROADWAYS

Street/Segment	Classification	Design Volume[a]	Shoulders	Bike Lanes	Parking	# of lanes	Median	Posted Speed
Bernardo Center Drive								
North of Stargaze Avenue	Major	30,000	Improved	Both	No	4	Raised	45
Stargaze Avenue to Oviedo Street	Major	30,000	Improved	Both	No	4	Raised	45
Oviedo Street to Carmel Mountain Road	Major	30,000	Improved	W/S	E/S	4	Raised	35
Carmel Mountain Road to Pimpernel Drive	Major	30,000	Improved	Both	No	4	Raised	40
Pimpernel Drive to Twin Trails Drive	Major	30,000	Improved	Both	No	4	Raised	45
Twin Trails Drive to South of Twin Trails Drive	Major	30,000	Improved	Both	No	4	Raised	45
Black Mountain Road								
Interstate 15 to Camino del Norte	Major	30,000	Improved	Both	No	4	Raised	45
Camino del Norte								
Interstate 15 to Bernardo Center Drive	Primary Arterial	50,000	Improved	Both	No	6	Raised	35
Camino Ruiz								
North of Park Village Road	Major	15,000[1]	Improved	No	Both	1NB/2SB	Raised	None
South of Park Village Road	Major	10,000[1]	Improved	No	Both	2	Raised	None
Camino San Bernardo								
Camino del Norte to Rancho Bernardo Road	Major	30,000	Improved	Both	No	4	Raised	None
Carmel Canyon Road								
Del Mar Heights Road to Carmel Creek Road	Major	30,000	Improved	Both	No	4	Raised	45
Carmel Country Road								
Del Mar Heights Road to Carmel Creek Road	Major	30,000	Improved	Both	No	4	Raised	45
Carmel Creek Road to Carmel Canyon Road	Major	30,000	Improved	Both	No	4	Raised	None
Carmel Canyon Road to Carmel Valley Road	UNDER CONSTRUCTION							
Carmel Creek Road								
Carmel Country Road to Valley Centre Road	Major	30,000	Improved	Both	No	4	Raised	40
Valley Centre Drive to Carmel Valley Road	UNDER CONSTRUCTION							

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TABLE 4B-1
EXISTING AREA ROADWAYS
(continued)

Street/Segment	Classification	Design Volume	Shoulders	Bike Lanes	Parking	# of lanes	Median	Posted Speed
Carmel Mountain Road								
Rancho Carmel Drive to Peñasquitos Drive		50,000	Improved	Both	No	6	Raised	45
Peñasquitos Drive to Gerana Street	Major	30,000	Improved	Both	No	4	Grade Separated	45
Gerana Street to Caminato de Luz	Major	30,000	Improved	No	Both	4	Raised	45
Via Rimini to Rancho Peñasquitos Boulevard	Major	30,000	Improved	Both	No	4	Raised	45
Rancho Peñasquitos Boulevard to Paseo Montalban	Major	30,000	Improved	No	No	4	Painted	40
Paseo Montalban to Paseo Valdear	Major	30,000	Improved	No	No	4	Raised	40
Paseo Valdear to Black Mountain Road	Major	30,000	Improved	Both	No	4	Raised	40
Black Mountain Road to Sundance Avenue	Major	30,000	Improved	No	Both	4	Raised	40
Carmel Valley Road/State Route 56								
Interstate 5 to El Camino Real	Major	30,000	Improved	No	No	2WB/3EB	Raised	None
El Camino Real South to El Camino Real North	Major	30,000	Improved	No	No	4	None	None
El Camino Real North to Carmel Creek Road	Freeway	60,000	Improved	No	No	4	Divided	None
Carmel Creek Road to Carmel Country Road	Freeway	60,000	Improved	No	No	4	Divided	None
Carmel Country Road to Black Mountain Road	Freeway	60,000	Improved	No	No	4	Divided	None
Del Mar Heights Road								
Interstate 5 to High Bluff Drive	Prime	50,000	Improved	Both	No	6	Raised	45
High Bluff Drive to El Camino Real	Prime	50,000	Improved	Both	No	6	Raised	45
El Camino Real to Carmel Country Road	Prime	50,000	Improved	Both	No	6	Raised	40
Carmel Country Road to Carmel Canyon Road	Prime	50,000	Improved	Both	No	6	Raised	45
El Apajo								
Via de Santa Fe to San Dieguito Road	Collector	9,500	Unimproved	No	No	2	None	45

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TABLE 4B-1
EXISTING AREA ROADWAYS
(continued)

Street/Segment	Classification	Design Volume[1]	Shoulders	Bike Lanes	Parking	# of lanes	Median	Posted Speed
El Camino Real (North)								
North of Via de la Valle	Collector	7,500	Unimproved	N. Side	No	2	None	None
Via de la Valle to San Dieguito Road	Collector	7,500	Unimproved	No	No	2	None	40
San Dieguito Road to Halfmile Drive	Collector	7,500	Unimproved	Both	No	2	None	50
Halfmile Drive to Del Mar Heights Road	Major	30,000	Improved	Both	No	4	Raised	45
Del Mar Heights Road to High Bluff Drive	Major	40,000	Improved	Both	No	6[1]	Raised	45
High Bluff Drive to Valley Centre Drive	Major	40,000	Improved	Both	No	6	Raised	45
Valley Centre Drive to Carmel Valley Road	Major	40,000	Improved	Both	No	6	Raised	45
El Camino Real (South)								
South of Carmel Valley Road	Collector	7,500	Unimproved	No	No	2	None	None
Park Village Road								
Black Mountain Road to Rumex Lane	Major	30,000	Improved	Both	No	4	Raised	45
Rumex Lane to Darkwood Road	Major	30,000	Improved	Both	No	4	Painted	45
Darkwood Road to Camino Ruiz	Major	30,000	Improved	N/S	S/S	4	Raised	45
Rancho Bernardo Road								
Interstate 15 to West Bernardo Drive	Major	30,000	Improved	Both	No	4	Raised	None
West Bernardo Drive to Camino San Bernardo	Major	30,000	Improved	Both	No	4	Raised	None
Rancho Santa Fe Farms Road								
San Dieguito Road to Black Mountain Road	Collector	7,500	Unimproved	No	Both	2	None	40
Rancho Diegueno Road								
Rancho Santa Fe Farms Rd. to San Dieguito Road	Rural Light Collector	7,100	Improved	No	Both	2	None	40

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TABLE 4B-1
EXISTING AREA ROADWAYS
(continued)

Street/Segment	Classification	Design Volume[1]	Shoulders	Bike Lanes	Parking	# of lanes	Median	Posted Speed
Rancho Peñasquitos Boulevard								
Interstate 15 to Calle de las Rosas	Major	30,000	Improved	No	No	4	Raised	None
Calle de las Rosas to Azuaga Street	Major	30,000	Improved	No	Both	4	Raised/ Painted	None
Azuaga Street to Carmel Mountain Road	Major	30,000	Improved	No	No	4	Painted	None
Camino San Bernardo – Alva Road	Major	30,000	Improved	Both	No	4	Raised	None
San Dieguito Road								
East of El Apajo	Collector	7,100	Improved	No	Yes	2	None	None
El Apajo to Camino Santa Fe	Collector	27,400	Improved	Both	No	4	Painted	45
Camino Santa Fe to El Camino Real	Collector	7,100	Improved	Both	No	2	None	55
Via de la Valle								
Interstate 5 to San Andreas Drive	Major	30,000	Improved	Both	Both[4]	4	Raised	None
San Andreas Drive to El Camino Real	Collector	7,100	Unimproved	No	No	2	None	50
El Camino Real to Via de Santa Fe	Collector	7,100	Varies	No	Both	2	None	45
West Bernardo Drive								
Rancho Bernardo Road to Bernardo Center Drive	Collector	15,000	Improved	Both	No	4	None	45

[1]Recommended maximum volume given in the City of San Diego Street Design Manual.
[2]Design volume was estimated for non-standard cross section.
[3]Varies on the east side from one to three lanes.
[4]Limited.

TABLE 4B-2
CITY OF SAN DIEGO LEVEL OF SERVICE THRESHOLDS

Street Classification	No. of Lanes	Cross Sections	Level of Service A (.50)	B (.70)	C (1.00)	D (1.1-1.3)	E (1.2-1.6)
Freeway	8		60,000	84,000	120,000	140,000	150,000
Freeway	6		45,000	63,000	90,000	100,000	120,000
Freeway	4		30,000	42,000	60,000	70,000	80,000
Expressway	6	102/122	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4	72/92	7,500	10,500	20,000	25,000	30,000
Collector (no center lane) (continuous left-turn lane)	4 2	64/84 52/72	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2	40/60	2,500	3,500	5,000	6,500	8,000
Collector (single-family)	2	40/60		–	2,200	–	–

SOURCE: Urban Systems Associates Inc. 1997.

NOTE: The volumes and the average daily level of service listed above are only intended as a general planning guideline. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

Legend:

xxx/xxx = curb-to-curb width (feet/right-of-way width (feet): based on the City of San Diego Street Design Manual.

xx,xxx = approximate recommended ADT based on the City of San Diego Street Design Manual.

TABLE 4B-3
COUNTY OF SAN DIEGO LEVEL OF THRESHOLDS

Class	X-Section	Level of Service A	B	C	D	E
Circulation Element Roads						
Expressway	126/146	<36,000	<54,000	<70,000	<86,000	<108,000
Prime Arterial	102/122	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road	78/98	<14,800	<24,700	<29,600	<33,400	<37,000
Collector	64/84	<13,700	<22,800	<27,400	<30,800	<34,200
Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Collector	40/84	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Light Collector	40/60	<1,900	<4,100	<7,100	<10,900	<16,200
Recreational Parkway	40/100	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Mountain	40/100	<1,900	<4,100	<7,100	<10,900	<16,200
Non-Circulation Element Roads						
Residential Collector	40/60	*	*	<4,500	*	*
Residential Road	36/56	*	*	<1,500	*	*
Residential Cul-de-Sac or Loop Road	32/52	*	*	<200	*	*

SOURCE: Urban Systems Associates Inc. 1997.

*Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

TABLE 4B-4
EXISTING STREET SEGMENT LEVELS OF SERVICE

Street/Segment	Class	LOS C Volume[1]	Existing ADT[2]	LOS[1]
Bernardo Center Drive				
Rancho Bernardo Road to Bernardo His. Pkwy.	4 lane Major	30,000	27,100	C
Bernardo His. Pkwy to I-15	4-lane Major	30,000	22,800	C
I-15 to West Bernardo Drive	4-lane Major	30,000	14,500	A
West Bernardo Drive to Camino del Norte	4-lane Major	30,000	18,700	B
Black Mountain Road				
North of Oviedo Street	4-lane Major	30,000	9,600	A
Oviedo Street to Carmel Mountain Road	4-lane Major	30,000	19,500	B
Carmel Mountain Road to Paseo Montalban	4-lane Major	30,000	11,300	A
Paseo Montalban to Twin Trails Drive	4-lane Major	30,000	12,400	A
Twin Trails Drive to SR-56	4-lane Major	30,000	32,000	D
SR-56 to Park Village Road	4-lane Major	30,000	35,000	D
Park Village Road to Mercy Road	4-lane Major	30,000	29,300	C
Camino del Norte				
I-15 to Bernardo Center Drive	6-lane Primary Arterial	50,000	22,500	A
Bernardo Center Drive to Camino San Bernardo	4-lane Major	30,000	5,100	A
Camino San Bernardo				
Camino del Norte to Rancho Bernardo Raod	4-lane Major	30,000	3,800	A
Carmel Creek Road				
SR-56 (Carmel Valley Rd.) to Carmel Country Rd.	4-lane Major	30,000	9,700	A
Carmel Country Road				
Del Mar Heights Road to Carmel Creek Road	4-lane Major	30,000	5,800	A
Carmel Creek Road to SR-56 (Carmel Valley Road)	4-lane Major	30,000	2,800	A
Carmel Mountain Road				
I-15 to Pellasquitos Drive	6-lane Primary Arterial	50,000	24,500	A
Pellasquitos Drive to Rancho Pellasquitos Blvd.	4 lane Major	30,000	12400	A
Rancho Pellasquitos Boulevard to Paseo Montalban	4-lane Major	30,000	24,800	C

TABLE 4B-4
EXISTING STREET SEGMENT LEVELS OF SERVICE
(continued)

Street/Segment	Class	LOS C Volume[1]	Existing ADT[2]	LOS[3]
Paseo Montalban to Paseo Valdear	4-lane Major	30,000	14,600	A
Paseo Valdear to Black Mountain Road	4-lane Major	30,000	15,000	B
Black Mountain Rd. to East of Black Mountain Rd.	4-lane Major	30,000	6,000	A
Carmel Valley Road (SR-56)				
I-5 to El Camino Real	4-lane Major	30,000	26,600	C
El Camino Real to Carmel Creek Road	4-lane Freeway	60,000	14,700	A
Carmel Creek Road to Carmel Country Road	4-lane Freeway	60,000	4,500	A
Carmel Country Road to Rancho Santa Fe Road	2-lane Collector	10,000	3,100	A
Del Mar Heights Road				
I-5 to High Bluff Drive	6-lane Primary Arterial	50,000	42,200	C
High Bluff Drive to El Camino Real	6-lane Primary Arterial	50,000	35,100	C
El Camino Real to Carmel Country Road	6-lane Primary Arterial	50,000	26,600	B
Carmel Country Rd. to Lansdale	6-lane Primary Arterial	50,000	14,800	A
El Apajo				
Via de Santa Fe to San Dieguito Road	2-lane Collector	7,500	7,900	D
El Camino Real				
Carmel Mountain Road to SR-56	6-lane Major	40,000	12,000	A
SR-56 to High Bluff Drive	6-lane Major	40,000	29,700	A
High Bluff Drive to Del Mar Heights Road	6-lane Major	40,000	9,500	A
Del Mar Heights Road to Quarter Mile Drive	4-lane Major	30,000	16,300	B
Quarter Mile Drive to Half Mile Drive	4-lane Major	30,000	11,600	A
San Dieguito Road to Via de la Valle	2-lane Collector	7,500	14,900	F
Park Village Road				
Black Mountain Rd. to Camino Ruiz	4-lane Major	30,000	14,500	A
Rancho Bernardo Road				
Bernardo Center Drive to I-15	4-lane Major	30,000	34,800	D
I-15 to West Bernardo Dr.	4-lane Major	30,000	39,900	E

TABLE 4B-4
EXISTING STREET SEGMENT LEVELS OF SERVICE
(continued)

Street/Segment	Class	LOS C Volume[1]	Existing ADT[2]	LOS[3]
West Bernardo Dr. to Via del Campo	4-lane Major	30,000	12,000	A
Via del Campo to Camino San Bernardo	4-lane Major	30,000	5,900	A
Camino San Bernardo to Alva Road	4-lane Major	30,000	2,000	A
Alva Road to Black Mountain Road	2-lane Collector	7,500	1,000	A
Rancho Peñasquitos Boulevard				
I-15 to Via del Sud	4-lane Major	30,000	31,600	D
Via del Sud to SR-56	4-lane Major	30,000	25,600	C
SR-56 to Carmel Mountain Road	4-lane Major	30,000	32,100	D
Rancho Santa Fe Farms Road				
San Dieguito Road to Black Mountain Road	2 lane Collector	7,500	2,000	A
San Dieguito Road				
El Apajo to Camino Santa Fe	4-lane Collector	20,000	9,000	A
Camino Santa Fe to El Camino Real	2-lane Collector	7,500	11,600	F
Via de Santa Fe				
Via de la Valle to El Apajo	2-lane Collector	7,500	6,900	C
Via de la Valle				
I-5 to San Andres Drive	4-lane Major	30,000	31,800	D
San Andres Drive to El Camino Real	2-lane Collector	7,500	23,900	F
El Camino Real to Via Santa Fe	2-lane Collector	7,500	26,300	F
West Bernardo Drive				
Rancho Bernardo Road to Bernardo Center Drive	4-lane Collector	20,000	14,100	C

[1]Refer to Table 2.
[2]SOURCE: Black Mountain Ranch Subarea Plan Traffic Impact Analysis, 11/97, Katz, Okitsu and Assoc.; SANDAG 1997 Book of Traffic Volumes
[3]Based on daily traffic volume thresholds given in Table 2.

TABLE 4B-5
EXISTING INTERSECTION AM/PM PEAK HOUR LEVELS OF SERVICE

Key Number[1]	Intersection	A.M. Peak Hour		P.M. Peak Hour	
		Delay[2]	LOS[3]	Delay[2]	LOS[3]
1	I-15 NB ramps/Rancho Bernardo Road	6	B	8.3	B
2	I-15 SB ramps/Rancho Bernardo Road	12.9	B	9.7	B
3	Bernardo Center Dr./I-15 NB ramps	31.0	D	85.1	F
4	Bernardo Center Dr./I-15 SB ramps	14.5	B	14.5	B
5	I-15 NB ramps/Camino del Norte	18.3	C	18.3	C
6	I-15 SB ramps/Camino del Norte	15.5	C	24.2	C
7	Bernardo Center Drive/Camino del Norte	8.3	B	11.6	B
8	Bernardo Center Drive/West Bernardo Drive	52.0	E	12.0	B
9	Rancho Bernardo Road/West Bernardo Dr.	16.6	C	24.9	C
10	Camino San Bernardo/Rancho Bernardo Rd.	10.5	B	9.6	B
11	Camino del Norte/Camino San Bernardo	7.1	B	7.3	B
12	Camino del Norte/Rancho Bernardo Road	FUTURE INTERSECTION			
13	Carmel Valley Road/Rancho Bernardo Road	FUTURE INTERSECTION			
14	Black Mountain Road/Carmel Valley Road	FUTURE INTERSECTION			
15	Camino del Norte/Resort Road	FUTURE INTERSECTION			
16	Camino del Norte/Camino Ruiz	FUTURE INTERSECTION			
17	Camino Ruiz/Resort Road	FUTURE INTERSECTION			
18	Camino Ruiz/San Dieguito Road	FUTURE INTERSECTION			
19	Camino Ruiz/Street "A" (north)	FUTURE INTERSECTION			
20	Camino Ruiz/Street "A" (south)	FUTURE INTERSECTION			
21	El Apajo/San Dieguito Road	.75	B	7.3	B
22	Via de la Valle/Via de Santa Fe	N/A[4]	A	N/A[4]	B
23	Camino Diegueno Road/San Dieguito Road	6.7	B	7.6	B
24	El Camino Real/Via de la Valle (east)	N/A[4]	A	N/A[4]	A
25	El Camino Real/Via de la Valle (west)	12.1	B	15.6	C
26	El Camino Real/San Dieguito Road	10.8	B	30.6	D
27	I-5 NB ramps/Via de la Valle	8.4	B	9.8	B
28	I-5 SB ramps/Via de la Valle	7.2	B	7.3	B
29	Del Mar Heights Road/I-5 NB ramps	15.9	C	22.0	C
30	Del Mar Heights Road/I-5 SB ramps	8.3	B	9.9	B
31	I-5 NB ramps/SR-56 (Carmel Valley Road)	7.6	B	8.7	B
32	I-5 SB ramps/SR-56 (Carmel Valley Road)	9.1	B	10.2	B

TABLE 4B-5
EXISTING INTERSECTION AM/PM PEAK HOUR LEVELS OF SERVICE
(continued)

Key Number[1]	Intersection	A.M. Peak Hour		P.M. Peak Hour	
		Delay[2]	LOS[3]	Delay[2]	LOS[3]
33	Carmel Mountain Road/I-5 NB ramps	FUTURE INTERSECTION			
34	Carmel Mountain Road/I-5 SB ramps	FUTURE INTERSECTION			
35	Carmel Mountain Road/El Camino Real	FUTURE INTERSECTION			
36	El Camino Real (south)/SR-56 (Carmel Valley Road)	9.2	B	8.3	B
37	El Camino Real (north)/SR-56 (Carmel Valley Road)	9.1	B	8.3	B
38	Carmel Creek Rd./SR-56 WB ramps (Carmel Valley Rd.)	0.37	B	0.39	B
39	Carmel Creek Road/Carmel Country Road	0.36	B	0.33	B
40	Carmel Country Road/Del Mar Heights Rd.	0.27	A	0.28	A
41	El Camino Real/Highbluff Drive	0.29	A	0.39	B
42	Del Mar Heights Road/Highbluff Drive	0.59	B	0.65	C
43	Del Mar Heights Road/El Camino Real	11.1	B	12.6	B
44	Carmel Country Road/Carmel Mountain Rd.	FUTURE INTERSECTION			
45	Camino Santa Fe Road/SR-56 EB ramps	FUTURE INTERSECTION			
46	Camino Santa Fe Road/SR-56 WB ramps	FUTURE INTERSECTION			
47	Carmel Valley Road/Del Mar Heights Road	FUTURE INTERSECTION			
48	Camino Ruiz/Park Village Road	0.16	A	0.14	A
49	Camino Ruiz/SR-56 EB ramps	FUTURE INTERSECTION			
50	Camino Ruiz/SR-56 WB ramps	FUTURE INTERSECTION			
51	Camino Ruiz/Carmel Valley Road	FUTURE INTERSECTION			
52	Black Mountain Road/Carmel Mountain Rd.	12.3	B	11.0	B
53	Black Mountain Road/SR-56 WB ramps	15.0	C	18.2	C
54	Black Mountain Road/SR-56 EB ramps	5.2	B	6.8	B
55	Black Mountain Road/Park Village Road	42.8	E	22.3	C
56	Carmel Mountain Rd./Rancho Penasquitos Blvd.	0.78	D	0.79	D
57	Rancho Penasquitos Bl./SR-56 WB ramps	11.2	B	23.8	C
58	Rancho Penasquitos Blvd./SR-56 EB ramps/ Azuaga Street	11.4	B	6.8	B
59	Azuaga Street/Rancho Penasquitos Boulevard	NOT APPLICABLE			
60	I-15 SB ramps/Rancho Penasquitos Blvd.	1.90	A	4.82	A
61	I-15 NB ramps/Poway Road	9.36	B	12.02	B

TABLE 4B-5
EXISTING INTERSECTION AM/PM PEAK HOUR LEVELS OF SERVICE
(continued)

Key Number[1]	Intersection	A.M. Peak Hour Delay[2]	A.M. Peak Hour LOS[3]	P.M. Peak Hour Delay[2]	P.M. Peak Hour LOS[3]
62	I-15 SB ramps/SR-56 (Ted Williams Parkway)	2.4	A	3.9	A
63	I-15 NB ramps/Ted Williams Parkway	10.6	B	21.6	
64	Carmel Mountain Road/I-15 SB ramps	10.4	B	9.59	B
65	Carmel Mountain Road/I-15NB ramps	7.52	B	10.42	B
66	Carmel Country Road/SR-56 EB ramps		FUTURE INTERSECTION		
67	Carmel Country Road/SR-56 WB ramps		FUTURE INTERSECTION		
68	Camino Santa Fe/Shaw Ridge Road		FUTURE INTERSECTION		
69	Carmel Valley Rd./Rancho Santa Fe Farms Rd.	1.9	A	1.6	A
70	Carmel Creek Rd./SR-56 EB ramps (Carmel Valley Rd.)		FUTURE INTERSECTION		
71	Carmel Country Road/Shaw Ridge Road		FUTURE INTERSECTION		
72	Camino Ruiz/Carmel Mountain Road		FUTURE INTERSECTION		
73	Rancho Bernardo Road/Bernardo Center Rd.	12.9	B	15.6	C
74	Carmel Valley Road/Third Internal Connection		FUTURE INTERSECTION		
75	Rancho Bernardo Road/Via del Campo	9.6	B	9.6	B

[1]See Figure 3 for location of existing intersections.
[2]Level of service is measured in terms of delay (average delay per vehicle in seconds) and evaluated in accordance with the 1995 Highway Capacity Manual. Criteria for signalized intersections is as follows:

Delay (seconds)	Level of Service
≤ 5.0	A
>5.0 and ≤ 15.0	B
>15.0 and ≤ 25.0	C
>25.0 and ≤ 40.0	D
>40.0 and ≤ 60.0	E
≥ 60.0	F

[3]LOS = level of service.
[4]Not applicable. Intersection is unsignalized. Highway Capacity Manual method for evaluation of unsignalized intersections was used. Level of service is for critical minor approach.

d) Existing Freeway Segment Levels of Service

Existing area freeway segments' LOS are shown in Table 4B-6. Interstate 5 south of SR-56 and I-15 from north of Rancho Bernardo Road to south of Poway Road operate at LOS F or lower during peak hours.

e) Ramp Meter Operations

Ramp meters are presently installed on most of the freeway ramps in the study area. The Caltrans book of Traffic Volumes for California State Highways in District 11 from 1983-1996 is the source for ramp volumes and peak hour meter rates used in this report. The maximum peak hour delay in minutes was estimated by calculating the excess demand, which is the difference between the meter flow rate and the peak hour demand, and then calculating the time required for excess demand to pass the ramp meter location (based on the Caltrans meter flow rate). The Caltrans method for determining the maximum queue length is calculated by multiplying the excess demand (number of vehicles) by 29 feet per vehicle to arrive at the length in feet for the entire queue. Table 4B-7 summarizes the results of this analysis.

Traffic Circulation Issues

1. What direct and/or cumulative traffic impacts would the project have on the existing and planned community and regional circulation networks?

1) Issue

What direct and/or cumulative traffic impacts would the project have on the existing and planned community and regional circulation networks?

Impacts

a) Project Trip Generation

There are two land use scenarios for Pacific Highlands Ranch because of the uncertainties regarding the alignment of SR-56 through the project site. As such, two separate land use plans have been developed which incorporate the two preferred alignments for SR-56. Table 4B-8 shows the trip generation for both the proposed land use plans. Project trip generation is based on City of San of San Diego trip generation rates.

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TABLE 4B-6
FREEWAY SEGMENT LOS

Segment	# of Lanes (one-way)	Capacity	ADT	Peak %	Direction	Truck	Peak Volume	V/C	LOS
I-5									
Lomas Santa Fe Dr./Via de la Valle	4	9,200	195,500	0.082	0.57	0.92	9,932	1.08	F
Via de la Valle/Del Mar Heights Rd.	5	11,500	208,000	0.082	0.57	0.92	10,567	0.92	D
Del Mar Heights Rd./Carmel Valley Rd.	5	11,500	210,000	0.082	0.57	0.92	10,669	0.93	E
Carmel Valley Rd./I-805	4	9,200	224,600	0.075	0.55	0.97	9,551	1.04	F0
I-15*									
Pomerado Dr./Ranch Bernardo Rd.	4	9,200	224,600	0.087	0.58	0.92	12,319	1.34	F1
Ranch Bernardo Rd./Bernardo Center Dr.	4	9,200	183,000	0.088	0.59	0.92	10,328	1.12	F0
Bernardo Center Dr./Camino del Norte	4	9,200	183,500	0.088	0.59	0.92	10,469	1.14	F0
Camino del Norte/Carmel Mountain Rd.	4	9,200	193,500	0.088	0.61	0.92	11,290	1.23	F0
Carmel Mountain Rd./SR-56	4	9,200	204,300	0.087	0.61	0.92	11,785	1.28	F1
SR-56/Poway Road	4	9,200	174,200	0.087	0.61	0.92	10,049	1.09	F0
Poway Road/Mercy Road	4	9,200	197,800	0.087	0.61	0.92	11,410	1.24	F0
SR-56									
El Camino Real/Carmel Creek Road	2	4,600	5,200	0.098	0.57	0.985	295	0.06	A
Carmel Creek Road/Carmel Country Rd.	2	4,600	4,300	0.098	0.57	0.985	244	0.05	A
Black Mountain Rd./Rancho Penasquitos Blvd.	2	4,600	21,400	0.099	0.55	0.985	1,183	0.26	A
Rancho Penasquitos Blvd./I-15	2	4,600	26,000	0.099	0.55	0.985	1,437	0.31	A

SOURCE: Caltrans 1997 Traffic Volumes.

V/C = volume to capacity ratio

*Without HOV lane volumes

TABLE 4B-7
EXISTING PEAK HOUR RAMP METERING DELAYS

Location	Peak	Demand	Flow	Excess Demand	Delay (minutes)	Queue (feet)
I-5 NB/Via de la Valle	PM WB	443	450	0	0.0	0
I-5 NB/Via de la Valle	PM EB	432	450	0	0.0	0
I-5 SB/Via de la Valle	AM WB	494	540	0	0.0	0
I-5 SB/Via de la Valle	AM EB	785	750	35	2.8	1,015
I-5 NB/Del Mar Heights Road	PM	1,158	1,050	108	6.2	3,132
I-5 NB/Del Mar Heights Road	AM WB	912	850	62	4.4	1,798
I-5 NB/Del Mar Heights Road	AM EB	676	680	0	0.0	0
I-5 NB/Carmel Valley Road	PM	675	700	0	0.0	0
I-5 SB/Carmel Valley Road	AM	1,213	1,100	113	6.2	3,277
I-15 SB/Rancho Bernardo Road	AM EB	680	700	0	0.0	0
I-15 SB/Rancho Bernardo Road	AM WB	479	500	0	0.0	0
I-15 NB/Rancho Bernardo Road	PM EB	784	800	0	0.0	0
I-15 NB/Rancho Bernardo Road	PM WB	518	550	0	0.0	0
I-15 SB/Bernardo Center Road	AM	532	550	0	0.0	0
I-15 NB/ Bernardo Center Road	PM	511	550	0	0.0	0
I-15 SB/Camino del Norte	AM	923	1,100	0	0.0	0
I-15 NB/Camino del Norte	PM	819	850	0	0.0	0
I-15 SB/Carmel Mountain Road	AM	1,239	1,143	96	5.0	2,784
I-15 NB/Carmel Mountain Road	PM	612	650	0	0.0	0
I-15 SB/SR-56	AM	527	450	77	10.3	2,233
I-15 NB/SR-56	PM	907	907	0	0.0	0

SOURCE: Caltrans 1997.

NB = northbound
SB = southbound
EB = eastbound
WB = westbound

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TABLE 4R-8

PROPOSED PROJECT TRIP GENERATION

Subarea Plan 1				A.M. Peak Hour					P.M. Peak Hour				
Use	Intensity	Trip Rate	ADT	%	Peak-Hour Traffic	In/Out Split*	In	Out	%	Peak-Hour Traffic	In/Out Split*	In	Out
Single-family du	3,243 du	10/du	32,430	8	2,594	2:8	519	2,076	10	3,244	7:3	2,271	973
Multi-family du	1,273 du	8/du	10,184	8	815	2:8	163	652	10	1,019	7:3	714	306
Multi-family du	500 du	8/du	3,000	8	240	2:8	48	192	10	301	7:3	211	90
Park	30 ac	50/ac	1,500	4	60	5:5	30	30	8	120	5:5	60	60
Elementary school	20 ac	60/ac	1,200	26	312	6:4	187	125	5	60	3:7	18	42
High school	48 ac	50/ac	2,400	20	480	8:2	384	96	14	336	3:7	101	235
High school (private)	50 ac	50/ac	2,500	20	500	8:2	400	100	14	350	3:7	105	245
Neighbor. Commercial**	150 KSF	120/KSF	18,000	4	720	6:4	432	288	11	1,980	5:5	990	990
Office	150 KSF	20/KSF	3,000	13	390	9:1	351	39	14	420	2:8	84	336
Office	14 ac	450/ac	6,300	13	819	9:1	737	82	14	882	2:8	176	706
Civic	4 ac	50/ac	175	2	4	8:2	3	1	10	18	5:5	9	9
TOTAL	5,016 du		80,689		6,934		3,254	3,681		8,730		4,739	3,992

Subarea Plan 2				A.M. Peak Hour					P.M. Peak Hour				
Use	Intensity	Trip Rate	ADT	%	Peak-Hour Traffic	In/Out Split*	In	Out	%	Peak-Hour Traffic	In/Out Split*	In	Out
Single-family du	3,069 du	10/du	30,690	8	2,455	2:8	491	1,964	10	3,070	7:3	2,149	921
Multi-family du	1,341du	8/du	10,728	8	858	2:8	172	687	10	1,074	7:3	752	322
Multi-family du	500 du	6/du	3,000	8	240	2:8	48	192	10	301	7:3	211	90
Park	30 ac	50/ac	1,500	4	60	5:5	30	30	8	120	5:5	60	60
Elementary school	20 ac	60/ac	1,200	26	312	6:4	187	125	5	60	3:7	18	42
High school	48 ac	50/ac	2,400	20	480	8:2	384	96	14	356	3:7	101	235
High school (private)	50 ac	50/ac	2,500	20	500	8:2	400	100	14	350	3:7	105	245
Neighbor. Commercial**	150 ac	72/ac	10,800	4	432	6:4	259	173	11	1,188	5:5	594	594
Office	150 KSF	20/ac	3,000	13	390	9:1	351	39	14	420	2:8	84	336
Office	17 ac	450/ac	7,650	13	995	9:1	895	99	14	1,071	2:8	214	857
Civic	4 ac	50/ac	200	2	4	8:2	3	1	10	20	5:5	10	10
TOTAL	4,910		80,868		7,014		3,393	3,621		6,802		4,693	4,108

du = dwelling unit; ac = acre

*City of San Diego.

**Neighborhood Cumulative Commercial rate is 72 trips per 1,000 square feet or a 40% reduction.

b) Cumulative Impacts

To determine future (cumulative) traffic impacts, computer travel forecasts were based on the SANDAG Series 8 traffic forecasting methodology and land use information developed by SANDAG. In addition, the cumulative forecasts assume the buildout of Carmel Valley, Torrey Hills, the Future Urbanizing area, 4S Ranch, and Santa Fe Valley. Following is an analysis of the potential transportation impacts which would result from implementing either Subarea Plan 1 or 2.

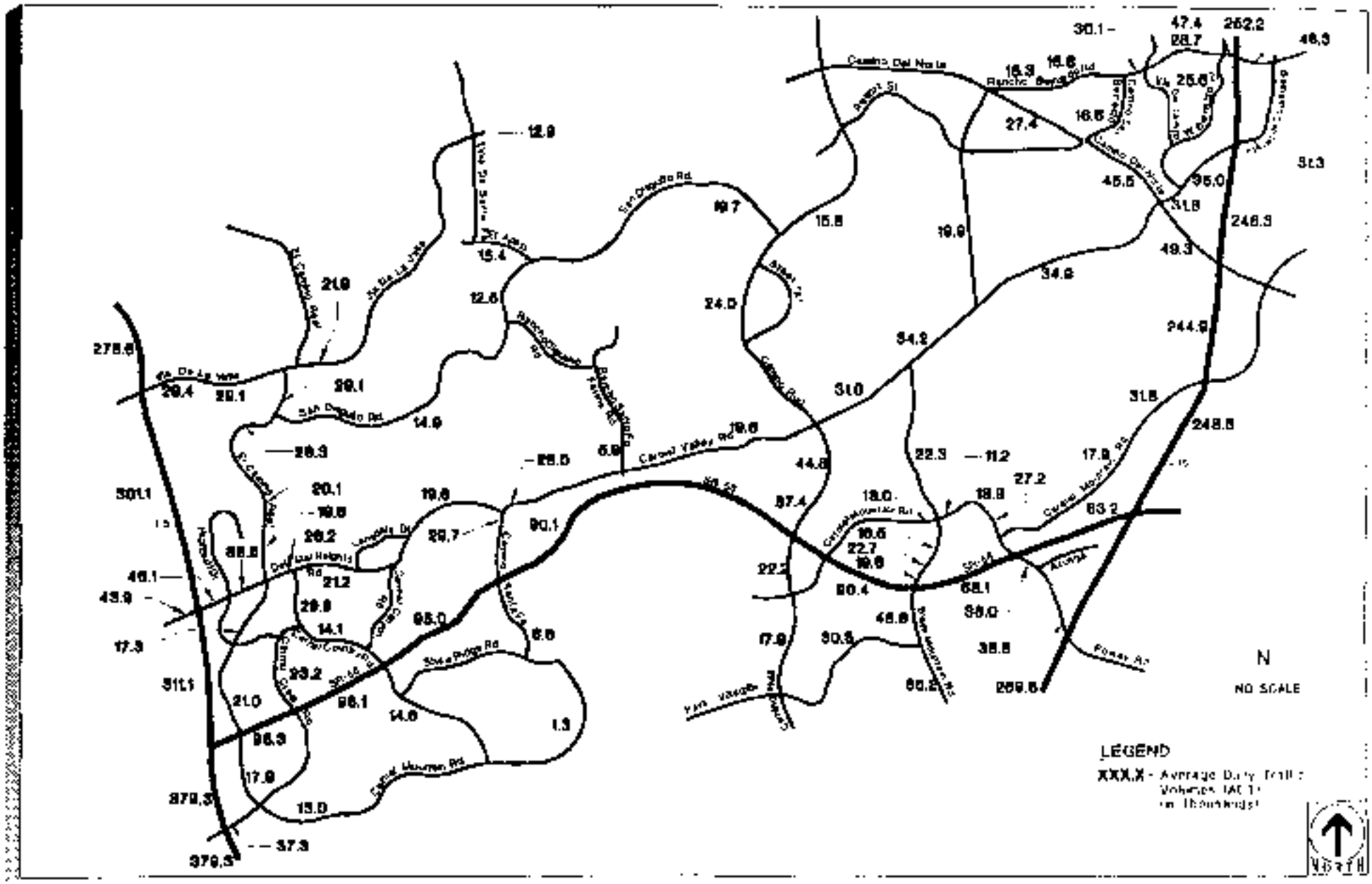
Subarea Plan 1 (SR-56 Alignment "F"). As shown in Table 4B-8, the total ADT for Subarea Plan 1 is 80,689 trips. As also shown, the project is estimated during the AM peak hour to generate 6,934 trips. During the PM peak hour, 8,730 trips are projected to be generated by the project. The proposed Subarea Plan 1 assumes full interchanges at SR-56/Camino Santa Fe (on-site) and SR-56/Camino Ruiz (off-site).

Future street segment ADT volumes are shown on Figure 4B-2 and the projected levels of service are included in Table 4B-9. As shown, the following street and freeway segments are projected to operate at a LOS E or F.

- Black Mountain Road from Park Village Road to Mercy Road
- El Apajo from Via de Santa Fe to San Dieguito Road
- Rancho Bernardo Road from Bernardo Center Drive to West Bernardo Drive
- Rancho Peñasquitos Boulevard from I-15 to Via del Sud/SR-56
- San Dieguito Road from Camino Ruiz to El Apajo
- San Dieguito Road from Rancho Diegueno Road to El Camino Real
- Scripps Poway Parkway east of I-15
- Via de Santa Fe from Via de la Valle to El Apajo
- Camino Ruiz north of SR-56
- Via de la Valle from El Camino Real east to Via Santa Fe
- I-5 from Via de la Valle to SR-56
- I-15 from Pomerado Road to Mercy Road

Also, based on existing flow rates the following interchange ramps exceed a 15-minute delay:

- I-5/Via de la Valle northbound and southbound ramps
- I-5/Del Mar Heights Road northbound and southbound ramps
- I-5/Carmel Valley Road northbound and southbound ramps



Source: Urban Systems Associates, Inc 1998

FIGURE 4B-2

Future Street Segment ADT, Subarea Plan 1

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TABLE 4B-9

SUBAREA PLAN I FUTURE STREET SEGMENT

LEVELS OF SERVICE

Street/Segment	Classification	Volume	ADT	LOS
Bernardo Center Drive				
Rancho Bernardo Road to Bernardo Heights Pkwy.	4-lane Major	40,000	31,300	D
Bernardo Heights Pkwy to I-15	4-lane Major	40,000	35,000	D
Interstate 15 to West Bernardo Drive	4-lane Major	40,000	31,800	D
West Bernardo Dr. to Camino del Norte	4-lane Major	40,000	34,900	D
Black Mountain Road				
North of Carmel Valley Road	4-lane Major	40,000	19,900	B
Carmel Valley Rd. to Carmel Mountain Road	4-lane Major	40,000	22,300	C
Carmel Mountain Road to Paseo Montalban	4-lane Major	40,000	16,500	B
Paseo Montalban to Twin Trails Dr.	4-lane Major	40,000	22,700	C
Twin Trails Dr. to SR-56	6-lane Major	50,000	19,600	A
SR-56 to Park Village Road	6-lane Prime	60,000	46,800	C
Park Village Road to Mercy Road	6-lane Prime	60,000	65,200	F
Camino del Norte				
I-15 to Bernardo Center Dr.	6-lane Prime	60,000	49,300	C
Bernardo Center Dr. to Camino San Bernardo	6-lane Prime	60,000	45,500	C
Camino San Bernardo to Black Mountain Rd.	6-lane Prime	60,000	27,400	B
Camino Ruiz				
North of San Dieguito Rd.	4-lane Major	40,000	15,800	B
San Dieguito Rd. to Carmel Valley Rd.	4-lane Major	40,000	24,000	C
Carmel Valley Rd. to SR-56	6-lane Major	50,000	57,400	F
SR-56 to Carmel Mountain Rd.	6-lane Major	50,000	22,200	B
Carmel Mountain Rd. to Park Village Rd	6-lane Major	40,000	17,900	A
Camino San Bernardo				
Camino del Norte to Rancho Bernardo Rd.	4-lane Major	40,000	16,600	B
Camino Santa Fe				
Del Mar Heights Rd. to SR-56	6-lane Major	50,000	29,700	C
South of SR-56	4-lane Major	10,000	6,600	C
Carmel Creek Road				
SR-56 to Carmel Country Road	4-lane Major	40,000	23,000	C
Carmel Country Road				
Del Mar Heights Road to Carmel Creek Road	4-lane Major	40,000	29,900	C
Carmel Creek Road to SR-56	4-lane Major	40,000	14,100	B
South of SR-56	4-lane Major	40,000	14,600	A
Carmel Mountain Road				
I-15 to Penasquitos Drive	6-lane Prime	40,000	31,800	B
Penasquitos Dr. to Rancho Penasquitos Blvd.	4-lane Major	40,000	17,900	B
Rancho Penasquitos Blvd. to Paseo Montalban	4-lane Major	40,000	27,200	C
Paseo Montalban to Paseo Valdear	4-lane Major	40,000	13,900	A
Paseo Valdear to Black Mountain Road	4-lane Major	40,000	11,200	A
Black Mountain Road to Camino Ruiz	4-lane Major	40,000	7,600	A
Camino Santa Fe to El Camino Real	4-lane Major	30,000	13,000	D
El Camino Real to I-5	6-lane Major	35,000	29,400	C

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TABLE 4B-9

SUBAREA PLAN 1 FUTURE STREET SEGMENT LEVELS OF SERVICE

(continued)

Street/Segment	Classification	Volume	ADT	LOS
Carmel Valley Road				
Del Mar Heights Rd. to Rancho Santa Fe Rd	4-lane Major	40,000	26,000	C
Rancho Santa Fe Road to Camino Ruiz	4-lane Major	40,000	19,600	B
Camino Ruiz to Black Mountain Rd.	4-lane Major	40,000	31,000	D
Black Mountain Rd. south to Black Mountain Rd. north	4-lane Major	40,000	34,200	D
Black Mountain Rd. north to Camino del Norte	4-lane Major	40,000	22,200	C
Del Mar Heights Road				
West of I-5	6-lane Prime	60,000	43,900	C
I-5 to High Bluff Drive	6-lane Prime	60,000	46,100	C
High Bluff Dr. to El Camino Real	6-lane Prime	60,000	36,500	C
El Camino Real to Carmel Country Road	6-lane Prime	60,000	26,200	B
Carmel Country Road to Lansdale East	6-lane Prime	60,000	21,200	A
Lansdale East to Carmel Valley Boundary	6-lane Prime	60,000	19,100	A
Carmel Valley Boundary to Camino Santa Fe	4-lane Major	40,000	19,600	B
El Apajo				
Via de Santa Fe to San Dieguito Road	2-lane Collector	16,200	15,400	E
El Camino Real				
Carmel Mountain Rd. to SR-56	6-lane Major	50,000	17,900	A
SR-56 to High Bluff Dr.	6-lane Major	50,000	21,000	B
High Bluff Dr. to Del Mar Heights Rd.	6-lane Major	50,000	17,300	A
Del Mar Heights Rd. to Quarter Mile Dr.	4-lane Major	40,000	19,300	B
Quarter Mile Dr. to Half Mile Dr.	4-lane Major	40,000	20,300	B
Half Mile Dr. to San Dieguito Rd.	4-lane Major	40,000	27,500	C
San Dieguito Rd. to Via de la Valle	4-lane Major	40,000	28,900	C
Mercy Road				
Black Mountain Rd. to I-15	4-lane Major	40,000	30,000	C
Park Village Rd.				
Black Mountain Rd. to Camino Ruiz	4-lane Major	40,000	30,800	D
Poway Road				
East of I-15	6-lane Prime	60,000	46,600	C
Rancho Bernardo Rd.				
Bernardo Center Dr. to I-15	4-lane Major	50,000	46,300	E
I-15 to West Bernardo Dr.	4-lane Major	50,000	47,400	E
West Bernardo Dr. to Via del Campo	4-lane Major	40,000	28,700	C
Via del Campo to Camino San Bernardo	4-lane Major	40,000	30,100	D
Camino San Bernardo to Alva Rd.	4-lane Major	40,000	16,600	B
Rancho Diegueno Road				
Rancho Santa Fe Farms to San Dieguito Road	2-light Collector	16200	4,200	C
Rancho Penasquitos Blvd.				
I-15 to Via del Sud	4-lane Major	40,000	38,000	E
Via del Sud to SR-56	4-lane Major	45,000	35,500	C

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TABLE 4B-9

SUBAREA PLAN 1 FUTURE STREET SEGMENT LEVELS OF SERVICE

(continued)

Street/Segment	Classification	Volume	ADT	LOS
Rancho Santa Fe Farms				
Rancho Diegueno Rd. to Monte Fuego Road	2-light Collector	16,200	3,900	B
Monte Fuego Road to Carmel Valley Road	2-lane Collector	10,000	5,900	C
San Dieguito Rd.				
Camino Ruiz to El Apajo	2-lane Collector	16,200	19,700	F
El Apajo to Rancho Diegueno Rd.	4-lane Collector	34,200	12,500	C
Rancho Diegueno Rd. to El Camino Real	2-lane Collector	16,200	14,900	F
Scripps Poway Parkway				
East of I-15	6-lane Prime	60,000	59,300	E
Via de Santa Fe				
Via de la Valle to El Apajo	2-lane Collector	16,200	12,900	F
Via de la Valle				
I-5 to San Andres Dr.	4-lane Major	40,000	29,400	C
San Andres Dr. to El Camino Real	4-lane Major	40,000	29,100	C
El Camino Real to Via Santa Fe	2-lane Collector	16,200	21,900	F

SOURCE: SANDAG Series 8 Black Mountain Ranch and Subarea III Traffic Forecast, Alternative 2, Interchange Model.

- I-15/Rancho Bernardo Road northbound and southbound ramps
- I-15/Bernardo Center Road northbound and southbound ramps
- I-15 southbound/Camino del Norte northbound and southbound ramps
- I-15 southbound/SR-56 northbound and southbound ramps

Because Subarea Plan I's traffic contribution to three of the roadway segments identified above exceeds 2 percent, Subarea Plan I is considered to have a direct traffic impact. The three road segments follow:

- Black Mountain Road from Park Village Road to Mercy Road
- El Apajo from Via de Santa Fe to San Dieguito Road
- San Dieguito Road from Rancho Diegueno Road to El Camino Real

Table 4B-10 shows the AM and PM peak hour intersection LOS for 74 intersections in the area. As shown, all intersections are projected to operate at a LOS D or better.

The lower levels of service in the Rancho Bernardo Area are due to high-intensity levels of development in adjacent city and county areas. Regional improvements will be required to mitigate the intersections of I-5 southbound ramps and SR-56 and I-15 northbound ramps and Ted Williams Parkway. For the remaining intersections at LOS E or F, project traffic from Subarea III is minimal. Therefore, the poor level of service is due to non-Subarea III developments.

The City of San Diego has prepared an environmental impact report for various alignments for the proposed central segment of SR-56. The above-mentioned street improvements were evaluated as part of the SR-56 study. Regional improvements should be provided as determined by the SR-56 EIR and public review process.

A freeway segment analysis of Subarea Plan 1 shows that I-5 and I-15 are projected to operate at a LOS F. All freeway segments for SR-56 are projected to operate at a LOS D or better.

A possible three-interchange configuration was also tested. The third interchange was assumed to be located approximately south of Carmel Valley Road and west of the Subarea III and Subarea 4 boundary about half way between the Camino Santa Fe and Camino Ruiz interchange. This analysis shows that the same street segments and intersections projected to operate at a LOS E or F when two interchanges are assumed are the same when a possible third interchange is included. Finally, both I-5 and I-15 are projected to operate at a LOS F in the three-interchange configuration and all freeway segments for SR-56 are projected to operate at a LOS D or better. Both interchange configurations result in levels of service "D" or better. However, for the two-interchange

TABLE 4B-10
SUBAREA PLAN 1 FUTURE PEAK HOUR INTERSECTION LEVELS OF SERVICE

Key Number[1]	Intersection	A.M. Peak Hour		P.M. Peak Hour	
		Delay[2]	LOS[2]	Delay[2]	LOS[2]
1	I-15 NB ramps/Rancho Bernardo Road	6.0	B	16.5	C
2	I-15 SB ramps/Rancho Bernardo Road	19.0	C	16.9	C
3	Bernardo Center Dr./I-15 NB ramps	28.2	D	36.1	D
4	Bernardo Center Dr./I-15 SB ramps	16.5	C	38.9	D
5	I-15 NB ramps/Camino del Norte	22.6	C	24.0	C
6	I-15 SB ramps/Camino del Norte	26.3	D	21.9	C
7	Bernardo Center Drive/Camino del Norte	12.2	B	18.0	C
8	Bernardo Center Drive/West Bernardo Drive	19.0	C	18.9	C
9	Rancho Bernardo Road/West Bernardo Drive	15.2	C	24.9	C
10	Camino San Bernardo/Rancho Bernardo Road	9.5	B	9.8	B
12	Camino del Norte/Rancho Bernardo Road	11.6	B	11.0	B
13	Carmel Valley Road/Rancho Bernardo Road	10.5	B	10.2	B
14	Black Mountain Road/Carmel Valley Road	13.0	B	14.0	B
16	Camino del Norte/Camino Ruiz	7.4	B	6.8	B
17	Camino Ruiz/Resort Road	9.0	B	11.5	B
18	Camino Ruiz/San Dieguito Road	6.6	B	7.3	B
19	Camino Ruiz/Street "A" (north)	11.6	B	11.0	B
20	Camino Ruiz/Street "A" (south)	11.6	B	11.0	B
21	El Apajo/San Dieguito Road	9.2	B	6.1	B
23	Camino Dieguenо Road/San Dieguito Road	6.8	B	7.6	B
25	El Camino Real/Via de la Valle (west)	19.5	C	25.0	C
26	El Camino Real/San Dieguito Road	8.7	B	12.4	B
27	I-5 NB ramps/Via de la Valle	13.4	B	11.2	B
28	I-5 SB ramps/Via de la Valle	7.9	B	11.4	B
29	Del Mar Heights Road/I-5 NB ramps	12.0	C	31.6	D
30	Del Mar Heights Road/I-5 SB ramps	7.5	B	9.6	B
31	I-5 NB ramps/SR-56 (Carmel Valley Road)	6.3	B	10.2	B
32	I-5 SB ramps/SR-56 (Carmel Valley Road)	12.7	B	10.2	B
36	El Camino Real (south)/SR-56 (Carmel Valley Road)	12.6	B	18.2	C
37	El Camino Real (north)/SR-56 (Carmel Valley Road)	10.1	B	12.3	B
40	Carmel Country Road/Del Mar Heights Road	10.7	B	11.8	B
42	Del Mar Heights Road/Highbluff Drive	16.1	C	13.2	B
43	Del Mar Heights Road/El Camino Real	12.4	B	14.3	B

TABLE 4B-10
SUBAREA PLAN 1 FUTURE PEAK HOUR INTERSECTION LEVELS OF SERVICE
(continued)

Key Number[1]	Intersection	A.M. Peak Hour Delay[2]	A.M. Peak Hour LOS[2]	P.M. Peak Hour Delay[2]	P.M. Peak Hour LOS[2]
45	Camino Santa Fe Road/SR-56 EB ramps	16.5	C	14.2	B
46	Camino Santa Fe Road/SR-56 WB ramps	20.9	C	10.9	B
47	Carmel Valley Road/Del Mar Heights Road	23.0	C	23.9	C
49	Camino Ruiz/SR-56 EB ramps	6.1	B	9.8	B
50	Camino Ruiz/SR-56 WB ramps	31.4	D	11.5	B
51	Camino Ruiz/Carmel Valley Road	15.4	C	20.4	C
52	Black Mountain Road/Carmel Mountain Road	13.9	B	15.3	C
53	Black Mountain Road/SR-56 WB ramps	11.9	B	22.9	C
54	Black Mountain Road/SR-56 EB ramps	10.3	B	10.7	B
55	Black Mountain Road/Park Village Road	37.2	D	37.6	D
57	Rancho Penasquitos Bl/SR-56 WB ramps	14.6	B	12.6	B
58	Rancho Penasquitos Bl/SR-56 EB ramps/ Azuaga Street	18.9	C	21.3	C
62	I-15 SB ramps/SR-56 (Ted Williams Parkway)	3.5	A	3.4	A
63	I-15 NB ramps/Ted Williams Parkway	17.8	C	11.3	B
69	Carmel Valley Road/Rancho Santa Fe Farms Road	11.4	B	11.0	B
73	Rancho Bernardo Road/Bernardo Center Road	7.6	B	32.1	D
74	Carmel Valley Road/Third Interchange Road	12.4	B	21.8	C

[1]See Figure 4B-3 for location of intersections

[2]LOS is measured in terms of delay (average delay per vehicle in seconds) and evaluated in accordance with the 1995 Highway Capacity Manual.

[3]Not applicable. LOS is for critical minor approach per Highway Capacity Manual unsignalized intersection analysis. Criteria for signalized intersections is as follows:

Delay (seconds)	Level of Service
≤5.0	A
>5.0 and ≤ 15.0	B
>15.0 and ≤ 25.0	C
>25.0 and ≤ 40.0	D
>40.0 and ≤ 60.0	E
≥60.0	F

configuration, "loop ramps" are required at the Camino Ruiz/SR-56 interchange. The loop on ramps are assumed in the northeast and southwest quadrant of the interchange.

Subarea Plan 2 (SR-56 Alignment "D"). The total ADT for Subarea Plan 2 is 80,689 trips. As shown on Table 4B-8, the project is estimated to generate 7,024 peak hour trips during the AM and 8,802 peak hour trips during the PM. The same street segments, intersections (AM and PM peak hours), and freeway segments for I-5, I-15, and SR-56 for Subarea Plan 2 are projected to operate at a LOS E or F as for Subarea Plan 1. This is true for either the two- or possible three-interchange configuration.

c) Subarea Three Signalized Access Analysis

As shown on Figures 3-1 and 3-2, both Subarea Plans include various signalized access locations along Del Mar Heights Road and Carmel Valley Road. All signalized access locations are projected to operate at a LOS D or better for both interchange configurations of either of the two proposed subarea plans. It should be noted that the intersection of Del Mar Heights Road and Carmel Valley Road is projected to operate at a LOS D in the PM peak for the two-interchange configuration and LOS C for the possible three-interchange configuration.

d) Community Impacts

Area traffic will be affected by development of the proposed project. Four area communities have been identified as being potentially affected by project traffic: (1) County (Fairbanks/Rancho Santa Fe); (2) Carmel Valley community; (3) Rancho Bernardo community; and (4) Peñasquitos community.

County Areas

Three road segments in the county would be affected by the project. These road segments are:

- Camino Ruiz south of San Dieguito
- El Apajo to Rancho Diegueno or San Dieguito east of El Camino Real
- Rancho Santa Fe Farms north of Carmel Valley Road

Most of the traffic represents trips that originate in county areas and have destinations within the project area such as persons living in the county who visit friends in the project area. Because the resulting LOS for all three segments will be LOS D or better, this is not considered a significant effect.

Carmel Valley

For the Carmel Valley community, project traffic on Del Mar Heights Road would vary from 5.5 percent (1,420 trips) east of I-5 to 13.8 percent (3,562 trips) east of Carmel Country Road. On El Camino Real, project trips would range from 2.6 percent (671 trips) south of SR-56 to only 0.2 (52 trips) percent north of High Bluff Drive. On Carmel Country Road, project traffic would range from 0.3 (77 trips) percent to 3.5 percent (904 trips). Because all segments are projected to operate at LOS D or better, traffic impacts from Subarea III are considered to be less than significant.

Rancho Bernardo

In Rancho Bernardo, traffic to and from the project would exceed five percent at three locations:

- Bernardo Center Drive west of I-15 (6.6 percent)
- Carmel Valley Road west of Camino del Norte (12.4 percent)
- Black Mountain Road from Camino del Norte to Carmel Valley Road (3.8 percent)

Because all segments are projected to operate at LOS D or better, traffic impacts from Pacific Highlands Ranch are considered to be less than significant.

Peñasquitos Community

Five locations in this community would be exceed five percent of total daily traffic flows. These locations are:

- Carmel Valley Road east of Camino Ruiz (14.3 percent, 4,430 trips)
- Carmel Valley road east of Black Mountain Road (10.8 percent, 3,680 trips)
- Camino Ruiz south of Carmel Valley Road (8.4 percent, 5.1 percent, 3,752, 1,133 trips)
- Black Mountain Road south of SR-56 (6.7 percent, 4.3 percent; 3,113, 2,807 trips)
- Black Mountain Road to I-15 (3.5 percent , 1,048)

For all of the above street segments except for Black Mountain Road south of Park Village Drive, LOS D is projected. Therefore, a significant impact would occur on Black Mountain Road.

e) Alternative Modes of Travel

Trail Circulation

Both subarea plans envision a series of trails which will provide alternative modes of non motorized circulation throughout the project site. Trails will be both paved and unpaved. Pedestrians, equestrians, and bicyclists will use the trail system. In addition to the trail system, bicycle paths will be provided within road rights-of-way to encourage non-motorized movement throughout the area.

Paved Trails and Paths

Paved paths and sidewalks will be provided in the rights-of-way of all major, connector, and local roads. These paths will be a minimum of five feet wide and will be separated from the road by a parkway or landscape buffer. Also, bicycle lanes will be provided, where feasible, in the right-of-way as an alternative to the automobile.

Improved Multi-Purpose Trails and Paths

Unpaved trails and paths will consist of compacted decomposed granite or similar material and will be intended for pedestrians, bicycles, and other similar activities, and will comply with the requirements of the American with Disabilities Act. (ADA).

Unpaved Trails and Paths

These trails and paths will be for hiking, biking, and horseback riding within the open space and will consist of loose decomposed granite or another similar substance. The trails will generally follow the contours of the natural terrain and will avoid all grading within the MSCP area, except when required to connect neighborhoods and the Town Center area. Interpretive signs will be provided where appropriate. As prescribed in the MSCP Plan, trails and paths within the MSCP area will utilize existing utilize existing utility easements and improvements where feasible.

Transit Center

In keeping with the concepts and ideas prescribed in the Framework Plan, integration of multiple transportation facilities to and through the Town Center area is important to the ultimate success of the community. The facility will permit both residents and visitors of the community to egress and ingress the area using a variety of transportation modes. The location encourages buses and other mass transportation vehicles to quickly and efficiently navigate the Town Center and Village area and the community. The transit center is located close to both residential and commercial land uses; therefore, it presents opportunities for alternative transportation within the community. The transit center will be designed in conformance with the guidelines established by the Metropolitan Transit Development Board (MTDB).

Utilizing the "F" alignment of SR-56 will permit the Town Center and Village area to be located on the north side of SR-56 and the transit center will be located in the Village. The "D" alignment of SR-56 will cause the Town Center and Village area to be located south of SR-56 and the transit center will be located in the Village. The "F" alignment provides for smoother and more efficient egress and ingress of transit vehicles.

f) Phasing Plan

The proposed Phasing Plan assumes that SR-56 is built and open to traffic by the end of the year 2000 as currently planned. Detailed graphics showing each phase are included in the transportation analysis, which is included under separate cover as Appendix B of this EIR.

Table 4B-11 shows the transportation phasing plan. As shown, there are seven phases (A-G). The first two phases (A-B) are for the Fairbanks Highlands and Subarea 4 projects. These two phases are provided for background information only. The number of dwelling units assumed for Fairbanks Highlands is based on a density of 1 unit per 4 acres. The current Subarea 4 development agreement does not have a pre-SR-56 development phase.

Phase C represents the Black Mountain Ranch project (Subarea 1) and is also presented only for information purposes. As shown, Black Mountain Ranch is currently entitled to 1,119 dwelling units based on their development agreement.

Phase D represents the initial start up phase for Subarea III. Subarea III would be allowed to develop 650 equivalent units. As with Phases A-C, the number of dwelling units for the first phase is based on a density of 1 unit per 4 acres. Extending Del Mar Heights Road as half of a four-lane major within a six-lane major right-of-way will provide access for the first phase of Subarea III. In addition, the Del Mar Heights Road disconnect is assumed until the SR-56 through-connection is complete. Also, completion of the Project Study Report (PSR) for the I-5/SR-56 north direct connectors is required.

For Phase E, both the completion of SR-56 as a four-lane freeway and the I-5/SR-56 dual freeway improvements are required. As shown on Table 4B-11, 1,250 dwelling units are permitted with Phase E improvements. Also, various off-site improvements are required. In addition, the Subarea III on-site infrastructure will be provided as required. Finally, funding of the project reports, Caltrans approval, and FHWA approval of the I-5/SR-56 direct connectors is required for Phase E.

State Transportation Implementation Plan (STIP) funding, design, and award of a construction contract for the I-5/SR-56 north direct connectors are required for Phase F. In addition, various off-site improvements by others are required as shown on Table 4B-11. Phase F provides for 1,500 dwelling units. Finally, for buildout of Subarea

TABLE 4B-11
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE A

Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
A Fairbanks Highlands	Improve old Black Mountain Road to Evergreen Nursery.	92 du		Background information approved project – 1 unit/4 acres density
B Subarea 4	Connect to existing Black Mountain Road or Carmel Mountain Road in Pefiasquitos.	0† du		Background information approved project
C Black Mountain Ranch	Development Agreement currently provides for up to 600 du to be developed with 3 access improvements: 1. A 2-lane collector along existing Black Mountain Road/Carmel Valley Road alignment. 2. A 2-lane connection to Black Mountain Road in Pefiasquitos 3. A 2-lane connection to San Dieguito Road. Beyond 519 units a 2-lane Camino Ruiz-SR-56 connection must be provided if SR-56 is constructed to Camino Ruiz	1,119 du		Background information approved project with development agreement. 1 unit/3 acres density

TABLE 4B-11
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE A
(continued)

	Phase	Proposed Access Improvements	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
D	Start-up Phase for Subarea III/Del Mar Heights Road	Del Mar Heights Road—extend as 2 lanes of a 4-lane major to development areas. Provide one-half of ultimate street improvement.	650 equivalent du	Successful vote November 1998/ Subarea Plan/Development Agreement approval by City Council Completion of a PSR for the I-5/SR-56 north direct connectors. One unit/4 acres density.	SR-56 ROW in Subarea III excluding ROW for the third interchange
E	Dual freeway completion/ SR-56 Freeway	SR-56 connected through as a 4-lane freeway between I-5 and I-15. Subarea III community infrastructure as required, including widening of Camino Santa Fe, Del Mar Heights Road, and Carmel Valley Road.	1,250 du + Private High School + Neighborhood Commercial (50,000 sf)	Funding for project reports, Caltrans approval, and FHWA approval of the I-5/SR-56 north direct connectors.	SR-56 at I-15, east to north loop ramp, east to south right turn lane, add southbound on ramp lane. Del Mar Heights Road at I-5 west to north-bound I-5 right turn lane. Black Mountain Road at Park Village Drive Intersection improvements (Dual NB to WB left turn lane).
F	5/56 North Connectors	Construct the I-5/SR-56 north direct connectors. Subarea III community infrastructure as required, including widening of Camino Santa Fe to 6 lanes.	1,500 du + Private High School + Neighborhood Commercial (100,000 sf)	STIP funding, design, and award contract for construction of the I-5/SR-56 north direct connectors.	Via de la Valle, between St Andrews and El Camino Real east, improve to four lanes. El Camino Real between One-half Mile Drive and Via de la Valle, improve to 4-lane major street. Carmel Valley Road, between Del Mar

TABLE 4B-11
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE A
(continued)

Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
				Height Road and Black Mountain Road, improve to 4 lanes. Widen Camino Ruiz from Carmel Valley Road to Carmel Mountain Road to 4 lanes (Camino Ruiz/SR-56 diamond interchange).
G Buildout of Subarea III	Completion of community infrastructure.	1,600 du + Private High School + Neighborhood Commercial (150,000 sf) + Commercial Office‡	I-5/SR-56 north direct connectors open to traffic.	I-15, from SR-56 to Escondido, HOV lane extension. I-5, from Del Mar Heights to Birmingham, add HOV lanes. Camino Ruiz from Carmel Valley Road to Carmel Mountain road, widen to 6 lanes. Camino Ruiz at SR-56, provide loops or Third Interchange at SR-56, provide third interchange Black Mountain Road, from SR-56 to Mercy Road, widen to six lanes. SR-56 widened to 6 lanes.
SUBAREA III TOTAL		5,000 du		

du = dwelling unit, sf = square feet; HOV = high-occupancy vehicle

*To be assured to the satisfaction of the City Engineer before development is authorized for each phase.
†No pre-SR-56 development. Development Agreement requires the assurance of SR-56.
‡May be provided in earlier phases based on equivalent dwelling units.

III, the I-5/SR-56 north direct connectors are required to be open to traffic. The required community infrastructure will also be completed. Table 4B-11 also identifies various off site improvements, which will be developed by others during the buildout of Subarea III. Based on street segment volumes, Table 4B-12 shows the projected levels of service in the Future Urbanizing area. It also shows Subarea III's contribution to the various street segments. As can be seen, all street segments shown are projected to operate at acceptable levels of service except for San Dieguito Road from Camino Ruiz to El Apajo, which is projected to operate at LOS E. Project traffic is only 12 ADT, which is 0.1 percent of the total. Black Mountain Road is projected to operate at LOS E/F and is a significant impact.

g) Alternative Phasing Plan

An alternative phasing plan would be implemented only if SR-56 implementation is delayed for any reason (legal challenges, environmental, right-of-way, design, construction, or funding problems). Table 4B-13 shows the alternative transportation phasing plan. As shown, there are phases A-K. Similar to the proposed phasing plan, the first three phases (A, B, and C) are for the Fairbanks Highlands, Subarea 4, and Black Mountain Ranch projects. Again, these three phases are provided for background information only.

The alternative phasing plan proposes that Carmel Valley Road be extended as a two-lane collector in its permanent location along the SR-56 corridor to Camino Santa Fe Road and Camino Santa Fe Road be connected with Black Mountain Road. In addition, Del Mar Heights Road would be "disconnected" until a through connection of SR-56 between I-5 and I-15 is opened.

Phase D also represents the initial start-up phase for Subarea III. During Phase D, Subarea III would be allowed to develop 650 units. As with the other subareas discussed in items A-C above, the number of dwelling units for the first phase is based on a density of 1 unit per 4 acres, which is allowed by present zoning. Access for the first phase of Subarea III will be provided by extending Del Mar Heights Road as half of a four-lane major within a six-lane major street right-of-way. As summarized on Table 4B-12, for Phase D, completion of the PSR for the I-5/SR-56 north direct connectors is required.

Phases E through H are proposed only if SR-56 is not built according to the present schedule. For Phase E, Carmel Valley Road (SR-56) would be widened to four lanes along the SR-56 corridor to Camino Santa Fe including the construction of the westbound off-ramps (two lanes). Also, Camino Santa Fe would be widened to four lanes. Finally, funding for the project reports I-5/SR-56 north direct connectors is required for Phase E. Phase E would allow 350 dwelling units and Phase F would allow 300 dwelling units and require completion and Caltrans District Director approval of the project reports for the I-5/SR-56 north direct connectors.

TABLE 4B-12

FUA PHASING: [YEAR 2005] STREET SEGMENT LEVELS OF SERVICE

Street/Segment	Class	LOS E	ADT	LOS	Project ADT	% ADT	Significant
			WITH SR 56				
Black Mountain Road							
Carmel Valley Rd. to Carmel Mtn. Rd	4LM	40,000	22,200	C	295	0.7	No
Carmel Mtn. Rd. to Twin Trails Dr.	4LM	40,000	21,300	C	8	0.0	No
Twin Trails Dr. to SR-56	4LM	40,000	17,000	A	8	0.0	No
SR-56 to Park Village Dr.	4LM	40,000	36,100	E	1,088	2.7	Yes
Park Village Rd. to Mercy Rd.	4LM	40,000	46,600	F	1,047	2.6	Yes
Camino Ruiz							
San Dieguito Rd. to Carmel Valley Rd.	4LM	40,000	20,100	B	427	1.1	No
Carmel Valley Rd. to SR-56	4LM	40,000	33,500	D	1,561	3.9	Yes
Camino Santa Fe							
Del Mar Height Rd. to SR-56	4LM	40,000	21,600	C	15,057	37.6	Yes
Carmel Valley Rd							
Del Mar Heights Rd. to Rancho Santa Fe Rd	4LM	40,000	21,400	C	13,957	34.9	Yes
Rancho Santa Fe Rd. to Camino Ruiz	4LM	40,000	6,600	A	7,348	18.4	Yes
Del Mar Heights Rd.							
I-5 to El Camino Real	6LP	60,000	39,300	C	2,467	4.1	Yes
El Camino Real to Carmel Valley boundary	6LP	60,000	21,600	A	2,574	4.3	Yes
Carmel Valley boundary to Camino Santa Fe	4LM	40,000	17,300	B	4,027	10.1	Yes
Rancho Santa Fe Farms							
Rancho Diegueno Rd. to Carmel Valley Rd.	2LC	10,000	2,400	A	481	4.8	Yes
San Dieguito Rd.							
Camino Ruiz to El Apajo	2LC	16,200	12,300	E	12	0.1	No
El Apajo to Rancho Diegueno Rd	4LC	34,200	5,700	C	293	0.9	No
Rancho Diegueno Rd. to El Camino Real	2LC	10,000	6,200	C	400	4.0	Yes[3]
			WITHOUT SR-56				
Black Mountain Road							
Carmel Valley Rd. to Carmel Mtn. Rd	4LM	40,000	23,600	C	295	0.7	No
Carmel Mtn. Rd. to Twin Trails Dr	4LM	40,000	19,000	B	8	0.0	No
Twin Trails Dr. to SR-56	4LM	40,000	15,600	B	8	0.0	No
SR-56 to Park Village Dr.	4LM	40,000	30,800	E	1,088	2.7	Yes
Park Village Rd. to Mercy Rd.	4LM	40,000	44,700	F	1,047	2.6	Yes
Camino Ruiz							
San Dieguito Rd. to Carmel Valley Rd.	4LM	40,000	23,000	C	427	1.1	No
Carmel Valley Rd. to SR-56	4LM	40,000	46,500	C	1,561	3.9	Yes
Camino Santa Fe							
Del Mar Height Rd. to SR-56	4LM	40,000	38,000	D	15,057	37.6	Yes
Carmel Valley Rd.							
Del Mar Heights Rd. to Rancho Santa Fe Rd.	4LM	40,000	38,000	D[2]	13,957	34.9	Yes
Rancho Santa Fe Rd. to Camino Ruiz	4LM	40,000	33,900	D	7,348	18.4	Yes
Del Mar Heights Rd							
I-5 to El Camino Real	6LP	60,000	39,200	C	2,467	4.1	No
El Camino Real to Carmel Valley boundary	6LP	60,000	17,200	A	2,574	4.3	No
Rancho Santa Fe Farms							
Rancho Diegueno Rd. to Carmel Valley Rd	2LC	10,000	4,700	A	481	4.8	Yes
San Dieguito Rd.							
Camino Ruiz to El Apajo	2LC	16,200	14,600	E	12	0.1	No
El Apajo to Rancho Diegueno Rd.	4LC	34,200	7,500	A	293	0.9	No
Rancho Diegueno Rd. to El Camino Real	2LC	10,000	9,900	E	400	4.0	Yes

[1] Capacity at LOS E from City of San Diego standards

[2] Interim condition, can be mitigated to LOS D with intersection widening or segment widening

[3] In initial phase (phase D), 41 dwelling units have access to San Dieguito Road which is currently operating at LOS F

Class

2LC = 2-lane collector, 4LC = 4-lane collector, 4LM = 4-lane major; 6LM = 6-lane major; 6LP = 6-lane prime

TABLE 4B-13
SUBAREA III ALTERNATIVE TRANSPORTATION PHASING PLAN

Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
A Fairbanks Highlands	Improve old Black Mountain Road to Evergreen Nursery.	92 du		Background information Approved project - 1 unit/4 acres density
B Subarea 4	Connect to existing Black Mountain Road or Carmel Mountain Road in Penasquitos.	0† du		Background information only – threshold being discussed with City staff. Approved project.
C Black Mountain Ranch	Extend Carmel Valley Road as a 2-lane collector along the SR-56 corridor to Camino Santa Fe Road and build Camino Santa Fe Road to connect with Black Mountain Road. Disconnect Del Mar Heights Road until a through connection of SR-56 between I-5 and I-15 is opened. Subject to SR-56 location selection. Beyond 600 units a 2-lane Camino Ruiz-SR-56 connection must be provided if SR-56 is constructed to Camino Ruiz.	1,119 du		Background Information Approved project with development agreement 1 unit/4-acre density. Development Agreement currently provides for up to 600 du to be developed with 3 access improvements: A. 2-lane collector along existing Black Mountain Road/Carmel Valley Road Alignment. B. A 2-lane connection to Black Mountain Road in Penasquitos. C. A 2-lane connection to San Dieguito Road Beyond 519 units a 2-lane Camino Ruiz-SR-56 connection must be provided if SR-56 is constructed to Camino Ruiz.

TABLE 4B-13
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE B
(continued)

	Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
D	Start-up Phase for Subarea III/Del Mar Heights Road	Del Mar Heights Road - extend as 2 lanes of a 4-lane major to development areas. Provide half of ultimate street improvement.	650 du	Successful vote November 1998/ Subarea Plan/Development Agreement approval by City Council. Completion of a Project Study Report (PSR) for the I-5/SR-56 north direct connectors. One unit/4 acres density.	SR-56 ROW in Subarea III provided to the satisfaction of the City Engineer, excluding ROW for the third interchange
E	Subarea III – pre SR-56 if necessary/Carmel Valley Road & SR-56	Widen Carmel Valley Road (SR-56) to 4 lanes along the SR-56 corridor to Camino Santa Fe including the construction of the westbound off-ramp (2 lanes) and extend and widen Camino Santa Fe Road to 4 lanes.	350 du	Funding for PR/ED in year 2000 STIP for the I-5/SR-56 north direct connectors.	Alternative phasing threshold only if SR-56 is not on the current schedule, i.e., open to traffic by December 2000. Construct Camino Ruiz as a 2-lane road from Carmel Valley Road to SR-56. Extend SR-56 as a 2-lane road from Black Mountain Road to Camino Ruiz.
F	Subarea III – pre-SR-56 if necessary/Carmel Valley Road & SR-56	Widen Carmel Valley Road (SR-56) to 4 lanes along the SR-56 corridor to Camino Santa Fe including the construction of the westbound off-ramp (2 lanes) and extend and widen Camino Santa Fe Road to 4 lanes.	300 du	Completion and CALTRANS District Director approval of the PR/ED for the I-5/SR-56 north direct connectors.	Alternative phasing threshold only if SR-56 is not on the current schedule, i.e., open to traffic by December 2000.

TABLE 4B-13
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE B
(continued)

	Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
G	Subarea III – pre-SR-56 if necessary/Carmel Valley Road & SR-56	Widen Carmel Valley Road (SR-56) to 4 lanes along the SR-56 corridor to Camino Santa Fe including the construction of the westbound off-ramp (2 lanes) and extend and widen Camino Santa Fe Road to 4 lanes.	300 du + private high school + Neighborhood Commercial (50,000 sf)	Submittal of CALTRANS approved I-5/SR-56 north direct connector project reports to FHWA for approval.	Alternative phasing threshold only if SR-56 is not on the current schedule, i.e., open to traffic by December 2000. Widen Camino Ruiz to a 4-lane road from Carmel Valley Road to SR-56. Extend SR-56 as a 4-lane road from Black Mountain Road to Camino Ruiz. SR-56 at I-15, east to north loop ramp, east to south right-turn lane, add southbound on ramp lane. Del Mar Heights Road at I-5 west to northbound I-5 right-turn lane. Black Mountain Road at Park Village Drive intersection improvements. (Dual NB to WB left-turn lane).
H	Subarea III – pre-SR-56 if necessary	Signalize and widen intersections to 6 lanes as required.	300 du + private high school + Neighborhood Commercial (50,000 sf)	FHWA approval of project reports for the I-5/SR-56 north direct connectors.	Alternative phasing threshold only if SR-56 is not on the current schedule, i.e., open to traffic by December 2000.
I	Route 56 freeway	SR-56 connected through as a 4 lane freeway between I-5 and I-15.	300 du + private high school + Neighborhood Commercial (100,000 SF)	Funding in the STIP for the I-5/SR-56 north direct connectors. Complete design of the I-5/SR-56 north direct connectors	

TABLE 4B-13
SUBAREA III TRANSPORTATION PHASING PLAN - ALTERNATIVE B
(continued)

	Phase	Proposed Access Improvement	Approved Project or Subarea III Development	Transportation Threshold Condition Regarding Status of Route 56 North Ramps*	Comment or Description of Other Regional Improvements*
J	Dual freeway completion	Construct the I-5/SR-56 north direct connectors. SR-56 connected through as a 4-lane freeway between I-5 and I-15.	1,200 du + private high school + Neighborhood Commercial (100,000 SF)	Award contract for construction of the I-5/SR-56 north direct connectors.	Via de la Valle, between El Andres and El Camino Real east, improve to four lanes. El Camino Real between Half-mile Drive and Via de la Valle, improve to 4-lane major street. Carmel Valley Road, between Del Mar Height Road and Black Mountain Road, improve to 4 lanes. Widen Camino Ruiz from Carmel Valley Road to Carmel Mountain Road to 4 lanes.
K	Buildout of Subarea III	Completion of community infrastructure.	1,600 du + private high school + Neighborhood Commercial (150,000 sf) + Commercial Office‡	I-5/SR-56 north direct connectors open to traffic.	I-15, from SR-56 to Escondido, HOV lane extension. I-5, from Del Mar Heights to Birmingham, add HOV lanes. Camino Ruiz from Carmel Valley Road to Carmel Mountain Road, widen to 6 lanes. Camino Ruiz at SR-56, provide loops or third interchange at SR-56, provide third interchange. Black Mountain Road, from SR-56 to Mercy Road, widen to six lanes. SR-56 widened to 6 lanes
	SUBAREA III TOTAL		5,000 du		

du = dwelling unit; sf = square feet; HOV = high-occupancy vehicle

*To be assured to the satisfaction of the City Engineer before development is authorized for each phase.
†No pre-SR-56 development. Development Agreement requires the assurance of SR-56.
‡May be provided in earlier phases based on equivalent dwelling units.

For Phase G, submittal of the Caltrans approved I-5/SR-56 north direct connectors project reports to Federal Highways Administration (FHWA) is required. As summarized on Table 4B-13, 300 dwelling units are permitted for Phase G. In addition, various off-site improvements by others are identified in Table 4B-12. Finally, Phase H requires FHWA approval of the project reports for the I-5/SR-56 north direct connectors and allows development of up to 300 dwelling units.

For Phase I both the completion of SR-56 as a four-lane freeway and the I-5/SR-56 dual freeway improvements are required and 300 dwelling units are allowed. In addition, funding in the STIP for the I-5/SR-56 north direct connectors is required for Phase I. Also, various off-site improvements are required as shown on Table 4B-13. The Subarea III on-site infrastructure will also be provided as required. Finally, complete design of the I-5/SR-56 north direct connectors is required for Phase I.

Award of a construction contract for the I-5/SR-56 north direct connectors are required for Phase J and 1,200 dwelling units are allowed. In addition, various off-site improvements are required as shown on Table 4B-13. Finally, for buildout of Subarea III, the I-5/SR-56 north direct connectors are required to be open to traffic. The required community infrastructure will also be completed. Table 4B-13 also identifies various off-site improvements which will be built by others during the buildout of Subarea III.

h) Carmel Valley Neighborhood 10 Precise Plan

As explained in the Project Description of this MEIR, part of the proposed MHPA boundary adjustment includes an increase of 174 dwelling units in Carmel Valley Neighborhood 10. In order to accommodate the increase in traffic associated with the increase in total dwelling units for Neighborhood 10, the combined phasing plan for Neighborhood 10 and 8A would be revised. The revised phasing plan is included in an attachment to the traffic analysis of Subarea III (see Appendix B, Attachment 3 of this MEIR).

The three changes proposed for the adopted combined Neighborhood 10 and 8A Phasing Plan are:

1. Add 15 multi-family dwelling units to reflect the final approved neighborhood plan.
2. Add 174 multi-family dwelling units to reflect the units transferred from 8A.
3. Revise the trip generation rate from 8 to 6 trips/unit due to increased density represented by the increase in units.

As shown in Attachment 3 and 4 of Appendix B, the increase in the total number of Neighborhood 10 units (15 + 174 = 189) is offset by a reduction in units permitted in

Neighborhood 8A, if development were permitted. Thus, there is no net change in roadway impacts due to the fact that Carmel Country Road was previously analyzed at its full capacity and the units transferred to Neighborhood 10 are fully offset by the reduction of units transferred from Neighborhood 8A. Therefore, the conclusions of the previous Neighborhood 10 traffic analysis remain unchanged and no further analysis is necessary.

Significance of Impacts

As discussed above, the following impacts are considered both direct and cumulatively significant:

- Development of 41 Phase I units east of the existing Del Mar Heights Estates.
- Project contribution of more than 2 percent traffic to Black Mountain Road/Park Village intersection.
- Additional traffic contribution to Black Mountain Road from SR-56 to Mercy Road (currently failing).
- Project contribution of more than 2 percent traffic to El Camino Real between Via de la Valle and Half Mile Drive (LOS F).
- Project contribution of 7.5 percent traffic to Camino Ruiz North or SR-56 at buildout without the third intersection (LOS E).
- Project contributions to freeway areas where wait already exceeds 15 minutes.
- Project contribution of more than 2 percent traffic to El Apajo from Via Santa Fe to San Dieguito Road.

The following project traffic impacts are considered adverse but because they do not exceed 2 percent of the total traffic they are less than significant:

- Via de la Valle between El Camino Real and San Andres.
- Rancho Bernardo Road
- San Dieguito Road between Camino Ruiz and El Apajo.

Mitigation

Table 4B-14 includes all of the area's transportation improvements necessary to reduce project impacts to the extent feasible; however, not all impacts are reduced to below a significant level. Table 4B-14 includes the location of the improvement, the type of the improvement, the party responsible for the improvement, and the level of significance after mitigation.

TABLE 4B-14
TRANSPORTATION IMPROVEMENT SUMMARY

Location	Improvement	Responsibility	Significance Level After Mitigation
ON-SITE			
Del Mar Heights Road	Construct as a 4-lane major in a 6-lane ROW from Community Plan boundary to Camino Santa Fe	Subarea III + others	Less than significant
SR-56/Camino Santa Fe	Construct interchange	Subarea III + others	Less than significant
Camino Santa Fe	Construct as a 6-lane major from SR-56 to Del Mar Heights Road.	Subarea III	Less than significant
Carmel Valley Road	Construct as a 4-lane major in a 6-lane ROW from Camino Santa Fe to subarea boundary.	Subarea III	Less than significant
San Dieguito Road	Construct a traffic signal at Del Mar Highlands Estates entrance.	Subarea III	Significant direct & cumulative
SR-56	Provide ROW in Subarea III for SR-56 to the satisfaction of the City Engineer	Subarea III	Less than significant
Various on-site collector streets	Construct as required by City Engineer	Subarea III	Less than significant
Various signal locations	Provide signals as determined by City Engineer	Subarea III	Less than significant
OFF-SITE			
State Route 56*	Widen to 6-lane freeway between I-5 and I-15	Fair-share contribution	Less than significant
State Route 56	Construct 4-lane freeway between I-5 and I-15.	Others	Less than significant
Interstate 5/State Route 56†	Construct northbound direct connectors	Fair-share contribution	Less than significant
Carmel Valley Road	Construct as a 4-lane major from Subarea III boundary to Camino Ruiz	Others	Less than significant
Camino Ruiz	Construct as 6-lane major from Carmel Valley Road to Carmel Mountain Road.	Others	Significant cumulative
Camino Ruiz/SR-56	Provide diamond interchange, upgrade includes "loops" or provide third interchange at SR-56	Others	Significant cumulative

TABLE 4B-14
TRANSPORTATION IMPROVEMENT SUMMARY

Location	Improvement	Responsibility	Significance Level After Mitigation
OFF-SITE (cont.)			
SR-56/I-15‡	Provide east to north loop ramp, east to south right-turn lane and southbound on ramp	Fair-share contribution	Less than significant
Black Mountain Road at Park Village	Provide intersection improvements; NB dual left-turn lanes, or SB right-turn lane.	Subarea III + others	Significant direct & cumulative
Del Mar Heights Road/I-5	Add west to northbound I-5 right-turn lane	Subarea III + others	Less than significant
Via de la Valle	Improve to 4 lanes between San Andres Drive and El Camino Real	Others	Less than significant
El Camino Real†	Improve to 4 lanes between Half Mile Drive and Via de la Valle	Fair-share contribution	Significant direct & cumulative
Black Mountain Road†	Improve to 6 lanes from SR-56 to Mercy Road	Fair-share contribution	Significant direct & cumulative
I-5	Provide HOV lanes from Del Mar Heights Road to Birmingham Dr.	Others	Significant cumulative (outside scope of project)
I-15	Provide HOV lane extension from SR-56 to Escondido	Others	Significant cumulative (outside scope of project)

ROW = right-of-way; HOV = high-occupancy vehicle

*The fair share for SR-56 widening to six lanes is based on the number of dwelling units in Subarea III relative to the total dwelling units in the NCFUA satisfactory to the City Engineer.

†The fair-share calculation should be based on the projects share of future growth of traffic, satisfactory to the City Engineer.

‡The fair share for SR-56/I-15 interchange should include project traffic volume from Carmel Valley Road east of Black Mountain Road or include Carmel Valley Road from Black Mountain Road to Camino del Norte in the final phase of development in Subarea III transportation phasing plan.

C. Biological Resources

Biological field surveys on the Pacific Highlands Ranch site were conducted in November and December of 1996 and April through January of 1998. The survey dates, times, weather conditions, and purpose of the survey conducted by Natural Resource Consultants (NRC) are included in Appendix C1. Information in this report incorporates the results of NRC's studies conducted in December 1996 through August of 1997 for Pardee and all other properties owned in this subarea. This report is supplemented by biological resources information collected by Sweetwater Environmental Biologists, Inc. (SEB) in 1993 and in December of 1996.

Existing Conditions

a) Vegetation

As shown on Figure 4C-1, a variety of native vegetation communities occur in Pacific Highlands Ranch. Approximately 1,320 acres or 50 percent of the 2,652-acre site are used for agricultural activities. The remaining portions of the site support patches of chaparral, coastal sage scrub, grassland, woodlands, riparian, and ruderal vegetation. Within the native habitats is a variety of vegetation communities, including coastal sage scrub, coyote bush scrub, disturbed coastal sage scrub, southern maritime chaparral, southern mixed chaparral, scrub oak chaparral, graded lands, and developed areas. The characteristics of each community are described below and summarized in Table 4C-1.

Chaparral

Chaparral is one of the two dominant native vegetation types in coastal southern California; the other is Diegan coastal sage scrub. Chaparral communities are dominated by evergreen shrubs that have small, thick, leathery leaves to resist water losses. Stands of chaparral generally constitute more or less dense, continuous cover of shrubs all of similar height, although this height varies from about 3 feet to over 12 feet, depending on the chaparral type, the soil quality, and the aspect.

Chaparral communities go through frequent cycles of burning and regeneration. The floral diversity, especially of herbaceous species, is greatest during the first years of regeneration following a fire. Within Pacific Highlands Ranch, there is chaparral undergoing various stages of this process; these stages are relatively transitory, and have not been distinguished. Sometimes, following a fire, however, a flora strongly dominated by black sage (*Salvia mellifera*) may become established, and may persist for several years until the slower growing chaparral shrubs replace it. Vegetation in this stage has been mapped as it appears at present: as coastal sage scrub—black sage-dominated. Four

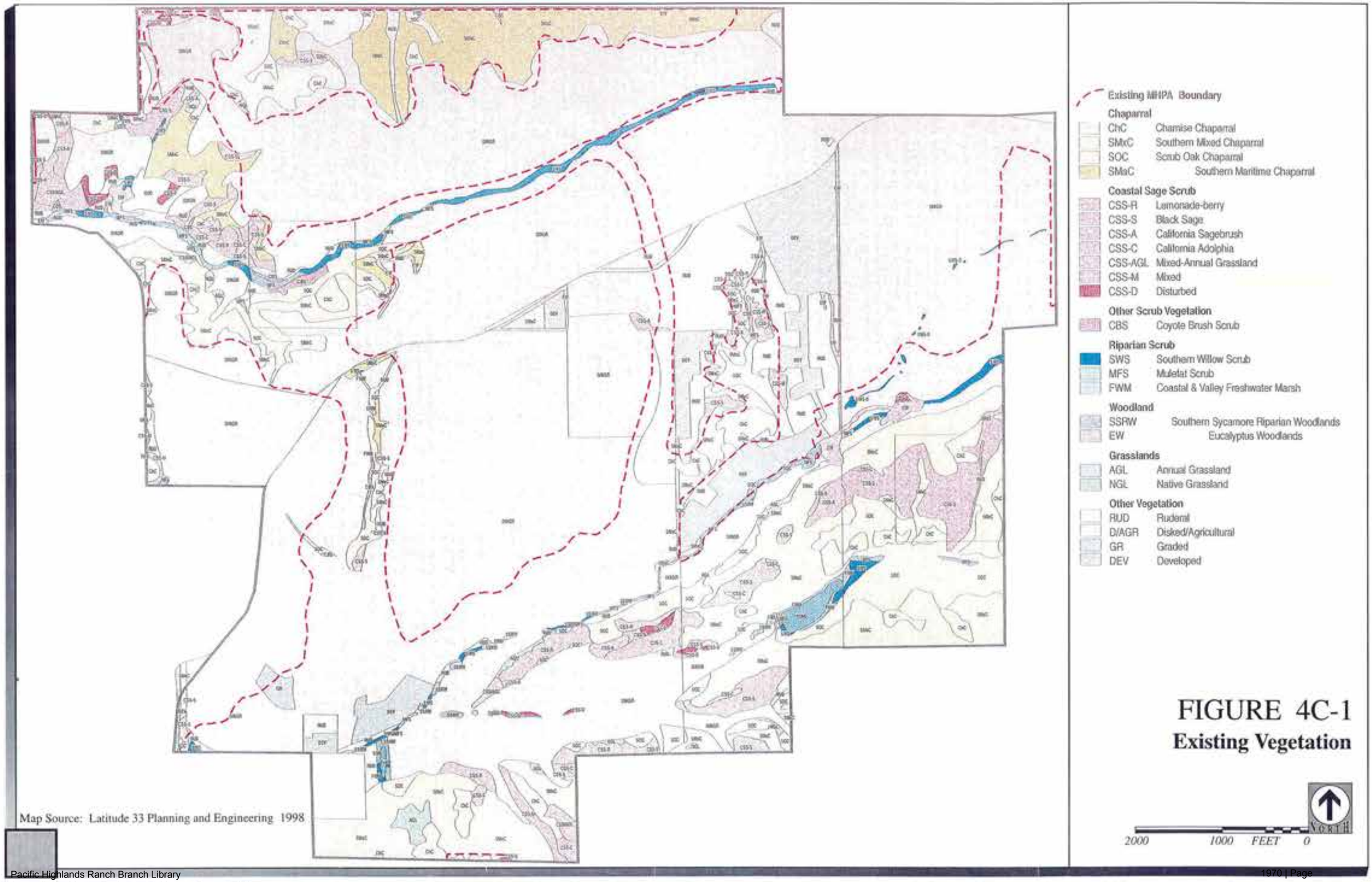


FIGURE 4C-1
Existing Vegetation

TABLE 4C-1
VEGETATION COMMUNITIES PRESENT ON THE PROJECT SITE

Vegetation Community	Map Symbol	Acres	Total
Chaparral			449.4
Chamise	ChC	46.0	
Southern maritime	SMaC	89.3	
Southern mixed	SMxC	227.0	
Scrub oak chaparral	SOC	87.1	
Coastal Sage Scrub			127.9
Lemonadeberry	CSS-R	17.2	
Black sage	CSS-S	63.0	
California sagebrush	CSS-A	13.1	
Mixed	CSS-M	12.3	
Disturbed	CSS-D	8.0	
Mixed-annual grassland	CSS-AGL	8.3	
California adolphia	CSS-C		
Other Scrub Vegetation			3.7
Coyote brush scrub	CBS	3.7	
Riparian Scrub			31.0
Southern willow scrub	SWS	17.6	
Mule fat scrub	MFS	10.4	
Coastal and valley freshwater marsh	FWM	3.0	
Woodland			21.82
Southern sycamore riparian	SSRW	2.8	
Eucalyptus woodlands	EW	14.8	
Pond		4.2	
Grasslands			2.1
Annual	AGL	0.6	
Native	NGL	1.5	
Other Vegetation			1,521.3
Ruderal	RUD	120.7	
Disked/agriculture	D/AGR	1320.3	
Graded	GR	3.6	
Developed	DEV	76.7	
TOTAL		2,157.2	2,157.2

different types of chaparral covering a total of 449.4 acres have been mapped, based on their different species composition.

Chamise (*Adenostoma fasciculatum*) is probably the most widely distributed chaparral shrub and is present in almost all types and occurrences of chaparral. This may be due in part to its dual ability to regenerate after a fire by both root-crown sprouting and by seed germination. Despite the ubiquity of chamise, chamise chaparral is defined as chaparral that comprises an almost monospecific stand of chamise. Few, isolated individuals of black sage, bushrue (*Cneoridium dumosum*), or mission manzanita (*Xylococcus bicolor*) may also be present.

In Pacific Highlands Ranch, chamise chaparral covers 46 acres and dominates flat mesa tops. This community also occurs in scattered patches on south-facing slopes. The latter occurrences are chiefly on poor-quality, pebbly soil, where the shrubs are lower and more widely spaced. This allows a sparse understory of low-growing herbaceous plants to become established. Important in this association are the sensitive species ashy spike-moss, along with small-flowered soap-plant (*Chlorogalum parviflorum*), goldfields (*Lasthenia californica*), fragrant everlasting (*Gnaphalium canescens* ssp. *beneolens*), and the spectacular yellow weed's mariposa lily (*Calochortus weedii* var. *weedii*).

Southern maritime chaparral is a mixed-dominance chaparral. Its important species include those characteristic of southern mixed chaparral, together with several species that are more restricted to the immediate coastal area. It occurs on weathered sandstone soils, and lies within the coastal fog belt. Dominant species in the southern maritime chaparral within Pacific Highlands Ranch are chamise, white coast ceanothus, or wart-stemmed lilac (*Ceanothus verrucosus*), mission manzanita, bushrue, Nuttall's scrub oak (*Quercus dumosa*), and summer holly (*Comarostaphylis diversifolia*). Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*) is also present, and Mojave yucca (*Yucca schidigera*) is often common. Southern maritime chaparral often has a relatively open cover of shrubs. In the understory, a characteristic species is the sensitive species Del Mar sand-aster (*Lessingia filaginifolia* var. *linifolia*). Also common are coast barrel cactus (*Ferocactus viridescens*), California plantain (*Plantago erecta*), skunkweed (*Navarretia hamata*), Weed's mariposa lily, woolly-fruited lomatium (*Lomatium dasycarpum*), and bird's foot cliff-brake (*Pellaea mucronata*). Brewer's calandrinia (*Calandrinia breweri*), although uncommon, occurs in this community.

In Pacific Highlands Ranch, southern maritime chaparral covers 89.3 acres and is common across the north and west, where it occupies sloping valley sides of any aspect. The southern maritime chaparral along the north-facing slopes in the northeast of the area is overwhelmingly dominated by white coast ceanothus, with localized Del Mar manzanita and summer holly, but little or no chamise.

Southern mixed chaparral is another mixed-dominance chaparral subcommunity. It has a long list of characteristic shrubs, including chamise, mission manzanita, Nuttall's scrub oak, summer holly, lemonadeberry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), Mojave yucca, redberry (*Rhamnus crocea*), white-flowered currant (*Ribes indecorum*), and fuchsia-flowered gooseberry (*Ribes speciosum*). Locally, San Diego mountain-mahogany (*Cercocarpus minutiflorus*) and Ramona lilac (*Ceanothus tomentosus* ssp. *olivaceus*) become important. Vines are an important component of southern mixed chaparral, especially on north-facing slopes. They include manroot (*Marah macrocarpus*), southern honeysuckle (*Lonicera subspicata* var. *denudata*), pipestem virgin's bower (*Clematis lasiantha*), and San Diego sweet pea (*Lathyrus vestitus* var. *alefeldii*).

Southern mixed chaparral often forms dense, impenetrable stands 6–20 feet tall, with little understory. However, around the edges, and within local openings, there is a diverse herbaceous assemblage beneath the shrubs, including hedge-nettle (*Stachys ajugoides* var. *rigida*), granny's hairnet (*Pterostegia drymarioides*), leafy daisy (*Erigeron foliosus*), chaparral star-lily (*Zigadenus fremontii*), woolly Indian paintbrush (*Castilleja foliolosa*), and unalaska rein orchid (*Piperia unalascensis*). On moister north-facing slopes there are California bee-plant (*Scrophularia californica*), sacapellote (*Acourtia microcephala*), sharp-tooth sanicle (*Sanicula arguta*), Pacific sanicle (*Sanicula crassicaulis*), and common chickweed (*Stellaria media*). Along the foot of north-facing slopes the sensitive species Palmer's sagewort or San Diego sagewort (*Artemisia palmeri*) is locally common.

In Pacific Highlands Ranch, southern mixed chaparral covers 227.0 acres and occupies many north-facing slopes. It also occurs on flatter areas, especially in the southern and eastern part of the area, further from the coast than the southern maritime chaparral.

Scrub oak chaparral is dominated by scrub oak. Within a few miles of the coast, as here in Pacific Highlands Ranch, the oak is Nuttall's scrub oak, which is itself a sensitive species. In addition to scrub oak, shrubs include occasional San Diego mountain-mahogany, toyon, and summer holly. Near creeks, the grass giant wild rye (*Leymus condensatus*), and the vine western virgin's bower (*Clematis ligusticifolia*) are often present. Scrub oak chaparral often has a very dense canopy, and the ground beneath it is covered thickly with leaf litter, so that there is little or no herbaceous understory. Where herbaceous plants are present, chiefly around the edges of north-facing scrub oak stands, they include common eucrypta (*Eucrypta chrysanthemifolia*), blue fiesta-flower (*Pholistoma auritum*), and miner's lettuce (*Claytonia perfoliata*).

In Pacific Highlands Ranch this community covers 87.1 acres. The principal occurrence of scrub oak chaparral is in the southeast, in Deer Canyon, where it occupies the entire canyon bottom, and spreads some way up the mesa sides to both north and south. It

occurs in smaller stands elsewhere throughout the subarea, mainly in valley bottoms and on the lower parts of north-facing slopes.

Diegan Coastal Sage Scrub

Coastal sage scrub is the second of the two dominant native vegetation types in this part of California. It occurs in the same general areas as chaparral, but tends to occupy drier, more xeric situations, such as south-facing slopes in contrast to chaparral-covered north-facing slopes. Sage scrub communities are dominated by lower-growing shrubs and subshrubs that lose their leaves to minimize water losses during summer drought. They may replace them with lesser amounts of smaller leaves. Many of the shrubs and subshrubs in coastal sage scrub are three to six feet tall, and have relatively open canopies. There is therefore often a significant herbaceous understory, including native grasses and colorful native annual wildflowers.

Four different types of Diegan coastal sage scrub covering 127.9 acres have been mapped, based on the dominant shrubby species in each case. In addition, mixed dominance and disturbed associations have been recognized.

Coastal Sage Scrub—Lemonadeberry-dominated. This type of coastal sage scrub forms a transition from chaparral communities, and is described first for that reason. It is completely dominated by lemonadeberry, with lesser amounts of toyon and often laurel sumac. These three species are tall, evergreen shrubs with leathery leaves, and fit the description of chaparral species. However, these three species are always found scattered in smaller numbers through coastal sage scrub of all types, and in lemonadeberry-dominated coastal sage scrub, other chaparral species are absent.

There is debate among botanists as to whether this community should be classified as a type of sage scrub, or a type of chaparral. The few openings between the taller shrubs are occupied by sage scrub species, mainly California sagebrush (*Artemisia californica*) and black sage, with patches of poison oak (*Toxicodendron diversilobum*), bush monkey-flower (*Mimulus aurantiacus*), and giant wild rye.

In Pacific Highlands Ranch, lemonadeberry-dominated coastal sage scrub covers 17.2 acres and is confined to north-facing slopes, mainly in the southern part of the area, along the north faces of Santa Monica Ridge and Shaw Ridge.

Coastal Sage Scrub—Black Sage-dominated. Black sage-dominated coastal sage scrub often consists of almost pure stands of black sage, although it can also include California sagebrush and California adolphia (*Adolphia californica*), and may grade into these sage scrub types. Herbaceous plants in openings between the shrubs include both native and introduced annual grasses, and a variety of annual wildflowers. On south- and southwest-facing slopes, this community contains significant populations of coast barrel cactus.

In Pacific Highlands Ranch, black sage-dominated coastal sage scrub covers 63.0 acres and occurs mainly on ridge tops and south-facing slopes, scattered across the entire area. In some places, this community is a temporary development, following a fire, which will be crowded out within a few years when the slower growing chaparral shrubs replace it.

Coastal Sage Scrub—California Sagebrush-dominated. California sagebrush-dominated coastal sage scrub is the typical form of sage scrub. California sagebrush is the most abundant species, but there is usually a fair diversity, with black sage, California adolphia, flat-top buckwheat (*Eriogonum fasciculatum*), scattered lemonadeberry, bladderpod (*Isomeris arborea*), and cacti: coast prickly-pear (*Opuntia littoralis*), pancake prickly-pear (*Opuntia oricola*), coast cholla (*Opuntia prolifera*), and coast barrel cactus. This community is usually relatively open, and includes many herbaceous species, especially native needlegrasses (*Nasella* spp.), with fringed spine-flower (*Chorizanthe fimbriata*), prostrate spine-flower (*Chorizanthe procumbens*), southern rosinweed (*Osmadenia tenella*), fascicled or golden tarweed (*Hemizonia fasciculata*), Nuttall's snapdragon (*Antirrhinum nuttallianum*), California wood-sorrel (*Oxalis albicans*), owlsclover (*Castilleja* spp., formerly *Orthocarpus* spp.), and arroyo lupine (*Lupinus succulentus*).

In Pacific Highlands Ranch, California sagebrush-dominated coastal sage scrub covers 13.1 acres and occurs locally, mainly on gently south-facing slopes in the western and southern part of the area.

Coastal Sage Scrub—California Adolphia-dominated. California adolphia-dominated coastal sage scrub is the least widely distributed of the sage scrub types; it occurs in California only in coastal San Diego County, and does not extend northwards into Orange County. It is dominated by the low-growing spiny shrub California adolphia, but also contains California sagebrush, black sage, and other typical sage scrub elements. Like California sagebrush-dominated coastal sage scrub, this community is relatively open, and it includes many of the same herbaceous species. Some key species in this community are ladies-fingers (*Dudleya edulis*), odora (*Porophyllum gracile*), California wood-sorrel, mesa saxifrage (*Jepsonia parryi*), bird's foot cliff-brake, and giant needlegrass (*Achnatherum coronatum*).

In Pacific Highlands Ranch, California adolphia-dominated coastal sage scrub covers approximately three acres and occurs mainly in relatively small patches. They generally occupy the upper parts of south-facing slopes, in dry, exposed situations. However, there is one larger area, on the south side of Santa Monica Ridge.

Coastal Sage Scrub—Mixed. This community consists of coastal sage scrub with two, or usually three co-dominant species from among California sagebrush, black sage, California adolphia, flat-top buckwheat, and lemonadeberry. It covers 12.3 acres in the south of Pacific Highlands Ranch.

Coastal Sage Scrub—Disturbed. Coastal sage scrub has been defined as disturbed when only some 50 -75 percent of ground cover comprises coastal sage scrub shrubs and subshrubs. Often the subshrubs include a high percentage of deerweed (*Lotus scoparius*). The intervening areas are more or less weedy annual grassland, with such species as sand mat (*Cardionema ramosissimum*), windmill pink (*Silene gallica*), tower mustard (*Arabis glabra*), Australian saltbush (*Atriplex semibaccata*), and even gazania (*Gazania linearis*). There are scattered patches of disturbed coastal sage scrub covering a total of 8.0 acres throughout Pacific Highlands Ranch.

Coastal Sage Scrub–Annual Grassland transition. This community completes the transition from coastal sage scrub to grassland. It consists of grassland with an open cover of between 15 percent and 50 percent of shrubs. The principal shrub present is California sagebrush, often with deerweed, and minor coast goldenbush (*Isocoma menziesii*) and cudweed-aster (*Lessingia filaginifolia* var. *virgata*). The grassland component is the same as the annual grassland described below; it is dominated by wild oats (*Avena* spp.), with lesser Italian ryegrass (*Lolium multiflorum*) and locally ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordaceus*), or foxtail chess (*Bromus madritensis* ssp. *rubens*). Important weeds include black mustard (*Brassica nigra*), and tocalote (*Centaurea melitensis*). There are scattered patches of coastal sage scrub—annual grassland transition covering a total of 8.3 acres throughout Pacific Highlands Ranch.

Coyote Bush Scrub. Coyote bush scrub is heavily dominated by coyote bush (*Baccharis pilularis*), and also contains tree tobacco (*Nicotiana glauca*), and minor amounts of California sagebrush, pampas grass (*Cortaderia* sp.), and tarragon (*Artemisia dracunculus*). The understory includes annual introduced grasses, saltgrass (*Distichlis spicata*), and clustered dock (*Rumex conglomeratus*).

Coyote bush scrub is typically found along valley bottoms where the water table is relatively high. Within Pacific Highlands Ranch this community covers 3.7 acres. It occurs at scattered locations in many of the small drainages.

Riparian Scrub

Southern Willow Scrub. Southern willow scrub is a riparian scrub; that is, it occurs along stream courses. The shrubs are dominated by arroyo willow (*Salix lasiolepis*), with lesser amounts of red willow (*Salix laevigata*) and black willow (*Salix gooddingii*). Also present are Mexican elderberry (*Sambucus mexicana*) and tree tobacco, with occasional weedy introductions including castor bean (*Ricinus communis*), tamarisk (*Tamarix* sp.), giant reed (*Arundo donax*), and pampas grass. The herbaceous understory consists of Mexican tea (*Chenopodium ambrosioides*), California mugwort (*Artemisia douglasiana*), and curly dock (*Rumex crispus*), with, in the eastern part of McGonigle Canyon, the sensitive species San Diego marsh-elder (*Iva hayesiana*). Wetland species occur within

the actual watercourses, including grass poly (*Lythrum hyssopifolia*), willow-weed (*Polygonum lapathifolium*), tall umbrella-sedge (*Cyperus eragrostis*), coastal bulrush (*Scirpus robustus*), wrinkled rush (*Juncus rugulosus*), and rabbitfoot grass (*Polypogon monspeliensis*).

In Pacific Highlands Ranch, southern willow scrub covers 17.6 acres and occurs in all the main drainages, and also locally in some minor ones. It is best developed in the eastern part of Gonzalez Canyon, in the eastern part of McGonigle Canyon, and near the pond in Deer Canyon.

Mule fat Scrub. Mule fat scrub is the other form of riparian scrub found in the area. The shrubs consist almost entirely of mule fat (*Baccharis salicifolia*), with occasional tree tobacco. The understory includes Mexican tea, cocklebur (*Xanthium strumarium*), curly dock, western ragweed (*Ambrosia psilostachya*), celery (*Apium graveolens*), and San Diego marsh-elder, together with annual introduced grasses. Wetland species within the actual watercourses include African brass-buttons (*Cotula coronopifolia*), grass poly, coastal bulrush, and rabbitfoot grass.

In Pacific Highlands Ranch, mule fat scrub covers a total of 10.4 acres and alternates with southern willow scrub along all the watercourses, and predominates in western Gonzalez and McGonigle Canyons.

Coastal and Valley Freshwater Marsh. Coastal and valley freshwater marsh occurs in waterlogged areas, usually with standing water, as around the edges of ponds. It is dominated by California bulrush (*Scirpus californicus*) and cattails (*Typha angustifolia* and *Typha latifolia*), tall monocots (grass-like plants) that can grow to 12 feet high. Minor components include tall umbrella-sedge, California cottonweed (*Epilobium ciliatum* ssp. *ciliatum*), and grass poly.

In Pacific Highlands Ranch, coastal and valley freshwater marsh covers 3.0 acres and is found mainly bordering the two ponds in the southern part of the area, in McGonigle Canyon and Deer Canyon. There are also patches in the small north–south drainage in the western part of the area.

Open Water. Open water is present in two ponds within Pacific Highlands Ranch, one in the western part of McGonigle Canyon, and the other in Deer Canyon. They are surrounded by coastal and valley freshwater marsh, and southern willow scrub, but themselves contain no vascular plants.

Woodland Vegetation

Southern Sycamore Riparian Woodland. This community occurs along flat valley bottoms, where the water table is near to the surface. Western sycamore (*Platanus*

racemosa) is the dominant species, forming large open trees. Many of the sycamores have parasitic colonies of big leaf mistletoe (*Phoradendron macrophyllum*). Understory shrubs are mainly poison oak, with minor Mexican elderberry and mule fat. In Pacific Highlands Ranch, there are several small stands of southern sycamore riparian woodland along the western parts of McGonigle and Deer canyons, in the southern part of the area. There is also sycamore woodland along Gonzalez Canyon in the Del Mar Highlands portion of the subarea. These areas total 2.8 acres.

Eucalyptus Woodland. Eucalyptus woodland is overwhelmingly dominated by eucalyptus (*Eucalyptus* sp.) trees, introduced from Australia. These fast-growing trees produce a large amount of leaf and bark litter, which prevents other species from growing in the understory. Although originally planted by man, these eucalyptus have become naturalized and are spreading in moist areas near the drainages. In Pacific Highlands Ranch, this community covers 14.8 acres in the eastern part of McGonigle Canyon and the western part of Gonzalez Canyon, and on the northern boundary of the area. There are also several planted lines of eucalyptus on the upland parts of the area.

Grasslands Vegetation

Annual Grassland. Annual grassland is dominated by introduced Mediterranean grasses, chiefly wild oats along with lesser Italian ryegrass, foxtail chess, soft chess, and ripgut grass. It contains some native species such as blue-eyed grass (*Sisyrinchium bellum*), common golden stars (*Bloomeria crocea*), stinging lupine (*Lupinus hirsutissimus*), tomcat clover (*Trifolium willdenovii*), and dove weed (*Eremocarpus setigerus*), but the most abundant non-grasses are also introduced weeds: black mustard, tocalote, smooth cat's-ear (*Hypochaeris glabra*), and bur-clover (*Medicago polymorpha*). Undisturbed grassland is rare within Pacific Highlands Ranch, as most grassy areas are regularly disked for agriculture. Annual grassland has been mapped in a few patches in the south of the area, and adjacent to Gonzalez Canyon in the northwest of the area.

Native Grassland. Native grassland is grassland where at least 10 percent of the cover is made up of purple needlegrass (*Nasella pulchra*). Other grasses are also present, as in the annual grassland, especially wild oats, Italian ryegrass, and foxtail chess. Native grassland hosts a rich non-grass flora of wildflowers, including common golden stars, blue dicks (*Dichelostemma capitatum*), blue-eyed grass, lilac mariposa lily (*Calochortus splendens*), southern rosinweed, golden daisy, canchalagua (*Centaurium venustum*), checker bloom (*Sidalcea malvaeflora*), four-spot or winecup clarkia (*Clarkia purpurea*), and Padres' shooting star (*Dodecatheon clevelandii*). There are also larger, more or less woody plants such as coast goldenbush and gumplant (*Grindelia camporum*).

In Pacific Highlands Ranch, native grassland is confined to a few small openings on north-facing slopes covering 1.6 acres. It has been mapped only at two locations in the

northwest of the area, and two more in the extreme south of the area. There are many more occurrences, too small to map.

Ruderal

Ruderal habitat is indicative of disturbed areas. It is dominated by coarse weedy introduced broad-leaved species, especially black mustard, perennial mustard (*Hirschfeldia incana*), lamb's quarters (*Chenopodium album*), Russian thistle (*Salsola tragus*), and horehound (*Marrubium vulgare*). Other common species are common sow-thistle (*Sonchus oleraceus*), twiggy wreathplant (*Stephanomeria virgata*), wild radish (*Raphanus sativus*), white sweet-clover (*Melilotus alba*), yellow sweet-clover (*Melilotus indica*), cheeseweed (*Malva parviflora*), jimsonweed (*Datura wrightii*), and dwarf nettle (*Urtica urens*).

In Pacific Highlands Ranch, ruderal vegetation covers 126.7 acres and has been mapped mainly in formerly disked agricultural areas. Some areas designated as ruderal have been cleared for development, but have been left alone allowing vegetation to return.

Disked/Agricultural

The majority of Pacific Highlands Ranch is regularly disked. At different seasons, parts of this disked area are used for agriculture (tomatoes, peppers, etc.), while other areas are allowed to grow weeds. Depending on the season, these areas may be open ground, or they may be occupied by a variety of mainly introduced species. These species include principally the grasses soft chess, foxtail chess, ripgut grass, Bermuda grass (*Cynodon dactylon*), and barley (*Hordeum* spp.), and the non-grasses sweet fennel (*Foeniculum vulgare*), common horseweed (*Conyza canadensis*), cardoon (*Cynara cardunculus*), telegraph weed (*Heterotheca grandiflora*), prickly lettuce (*Lactuca serriola*), bristly ox-tongue (*Picris echioides*), lesser wart-cress (*Coronopus didymus*), spurrey (*Spergula arvensis*), poison hemlock (*Conium maculatum*), and common purslane (*Portulaca oleracea*).

In Pacific Highlands Ranch, the disked/agricultural designation covers 1,320.3 acres and has been applied to the majority of the area, including most flat land and gentle slopes, except for the mesa tops in the extreme south and southeast of the area.

Graded

The graded designation has been applied to freshly graded areas where significant amounts of dirt have been either scraped off or added, so that regeneration of the original vegetation is unlikely. The main graded area at the time of the survey was in the southwest of Pacific Highlands Ranch. These areas cover 3.6 acres.

Developed

Developed habitat includes buildings, pavement and roads, nurseries, and storage yards. Plant species present are exotics that have been planted for ground cover, as along roadsides adjacent to new homes. In Pacific Highlands Ranch, developed habitat covers 10.4 acres and has been mapped at several points around the perimeter, where adjacent developed areas, often stabilized artificial slopes, extend into the area. There is a large agricultural storage yard in the southwest of the area. On non-Pardee acreage, there are developed areas (homes, stables, nurseries) in the extreme west of the area, and in the north–south strip in the eastern part of the area.

b) Wildlife

The coastal sage scrub, chaparral, grassland, riparian scrub, and eucalyptus woodland habitats that are present on-site provide ample foraging and cover habitat for a variety of vertebrate and invertebrate species. A list of vertebrate species that were observed during the surveys is provided in Appendix C1. A description of the wildlife observed using this site during the surveys is provided below.

Amphibians

Water is present on the site on a seasonal basis, and very few amphibians are expected to occur on-site and none were detected during the current surveys. Amphibian species that may occupy the site include the western toad (*Bufo boreas*) Pacific slender salamander (*Batrachoseps pacificus*), and California chorus frog (*Pseudacris cadaverina*).

Reptiles

Reptiles detected during the surveys of the site include the western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), orange-throated whiptail (*Cnemidophorus hyperythrus*), and striped racer (*Masticiphis lateralis*).

The following secretive reptile species could potentially occur on the site: western skink (*Eumeces skiltonianus*), silvery legless lizard (*Anniella pulchra pulchra*), western blind snake (*Leptotyphlops humilis*), night snake (*Hypsiglena torquata*), glossy snake (*Arizona elegans*), San Diego ringneck snake (*Diadophis punctatus similis*), western black-headed snake (*Tantilla planiceps*), and lyre snake (*Trimorphodon biscutatus*).

The following reptile species potentially occur on the site and prefer open habitats, or move between areas of dense cover and open areas: coastal western whiptail (*Cnemidophorus tigris multiscutatus*), racer (*Coluber constrictor*), common kingsnake (*Lampropeltis getulus*), northern red diamond rattlesnake (*Crotalus ruber ruber*), coastal rosy boa (*Lichanura trivirgata rosafusca*), coachwhip (*Masticophis flagellum*), and coast patch-nosed snake (*Salvadora hexalepis virgultea*).

Birds

Birds commonly observed on-site include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), Anna's hummingbird (*Calypte anna*), Cassin's kingbird (*Tyrannus vociferans*), cliff swallow (*Hirundo pyrrhonota*), scrub jay (*Aphelocoma coerulescens*), bushtit (*Psaltriparus minimus*), Bewick's wren (*Thryomanes bewickii*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), California thrasher (*Toxostoma redivivum*), rufous-sided towhee (*Pipilo erythrophthalmus*), California towhee (*Pipilo crissalis*), grasshopper sparrows (*Ammodramus savannarum*), song sparrows (*Melospiza melodia*), white-crowned sparrows (*Zonotrichia leucophrys*), and lesser goldfinches (*Carduelis psaltria*).

In addition, numerous raptors were observed foraging on site, including turkey vulture (*Cathartes aura*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), and red-tailed hawk (*Buteo jamaicensis*).

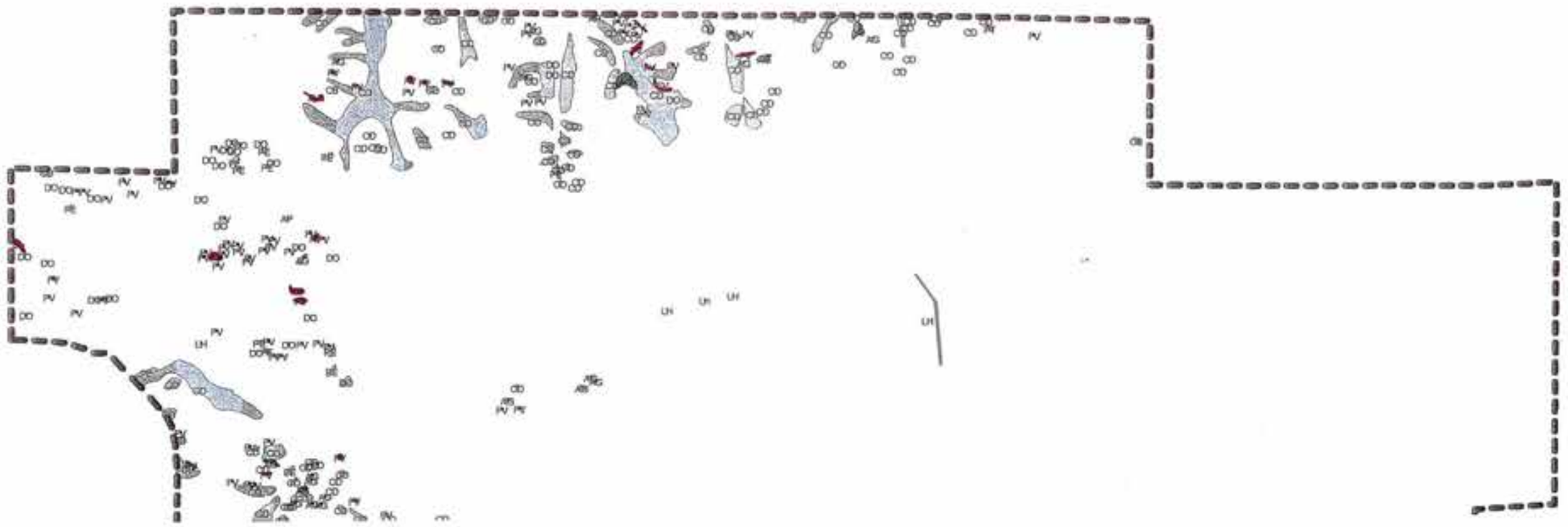
Mammals

The mammal fauna of the project site is also typical of coastal San Diego County. Mammals directly observed, or for whom diagnostic surface sign was found, included desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), woodrat (*Neotoma* sp.), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*).

Other common mammals likely to occur on-site, but not directly observed, include the Virginia opossum (*Didelphis virginiana*), brush rabbit (*Sylvilagus bachmani*), California pocket mouse (*Chaetodipus californicus*), Pacific kangaroo rat (*Dipodomys agilis*), western harvest mouse (*Reithrodontomys megalotis*), brush mouse (*Peromyscus boylii*), California mouse (*Peromyscus californicus*), cactus mouse (*Peromyscus eremicus*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), California vole (*Microtus californicus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). In addition, the site may provide foraging habitat for numerous bat species including evening bats (Vespertilionidae) and free-tailed bats (Molossidae).

c) Sensitive Biological Resources

The sensitive vegetation communities and species that have been detected on the Pacific Highlands Ranch site, and the species that have been found to occur in the vicinity of the site, are discussed in this section and shown in Figure 4C-2. A complete list of sensitive plant and wildlife species occurring or potentially occurring on-site is presented in Table 4C-2. Table 4C-3 defines the sensitivity codes used in Table 4C-2.



(See Sheet 2)

- Adolphia - Adolphia californica (AC)
- Del Mar Manzanita - Arctostaphylos glandulosa ssp. crassifolia (AG)
- Palmer's sagebrush - Artemisia palmeri (AP)
- Calandrinia breweri (CB)
- Summer Holly - Comarostaphylis diversifolia ssp. diverifolia (CD)
- Dichondra - Dichondra occidentalis (DO)
- San Diego barrel cactus - Ferocactus viridescens (FV)
- Palmer's grapplinghook - Harpagonella palmeri (HP)
- HV
- San Diego marsh-elder - Iva hayesiana (IH)
- Grass poly - Lythrum hyssopifolia (LH)
- San Diego golden star - Muilla clevelandii (MC)
- Californ ia Plaintain - Plantago erecta (PE)
- Slender woolly-heads - Psilocarphus tenellus (PT)
- Nuttall's scrub oak - Quercus dumosa (QD)
- Pygmy spikemoss - Selaginella cinerascens (SC)

NORTH

1600 800 FEET 0

Source: Project Design Consultants, 1997

FIGURE 4C-2

Sensitive Plant Species
Northern Portion

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Plants				
Acanthomintha ilicifolia† San Diego thornmint	FPE	CE	List 1B	Not detected on-site.
Adolphia californica California adolphia	--	--	List 2	Not detected on-site.
Arctostaphylos glandulosa ssp. *Crassifolia* Del Mar manzanita	FE	--	List 1B	Detected on-site. NRC recorded approximately 11 clusters of Del Mar Manzanita totaling approximately 425 trees.
Artemisia palmeri San Diego sagewort	--	--	List 2	Detected on site. On-site, this species occurs abundantly, with over 1,100 individuals, along the course of the McGonigle Canyon and its tributaries, all the way from the extreme southwest of the area across to the eastern boundary.
Atriplex pacifica South Coast saltscale	FSC	--	List 1B	Not detected on-site.
Baccharis vanessae† Encinitas baccharis	FPE	CE	List 1B	Not detected on-site.
Bergerocactus emoryi Golden-spined cereus	--	--	List 2	Not detected on-site.
Brodiaea filifolia Thread-leaved brodiaea	FPT	CE	List 1B	Not detected on-site.
Brodiaea orcuttii Orcutt's brodiaea	FSC	--	List 1B	Not detected on-site.
Calandrinia breweri Brewer's calandrinia	--	--	List 4	Detected on-site. One specimen was found in the northwest portion of the site.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status USFWS	Status CDFG	Status Other*	Occurrence Status On-Site
Plants (cont.)				
Ceanothus verrucosus White coast ceanothus	FSC	--	List 2	Detected on-site. This species was detected throughout the chaparral vegetation, and scattered within the disturbed coastal sage scrub vegetation. Tens of thousands of ceanothus occur on-site.
Chorizanthe orcuttiana Orcutt's spineflower	FE	CE	List 1B	Not detected on-site.
Chorizanthe polygonoides var. *longispina* Long-spined spineflower	FSC	--	List 1B	Not detected on-site.
~~*Chorizanthe procumbens* Prostrate spineflower~~	~~--~~	~~--~~	~~List 4~~	~~Detected on-site; this species was detected in disturbed coastal sage scrub and disturbed coastal sage scrub/non-native grassland vegetation, and was associated with sandy soils.~~
Comarostaphylos diversifolia ssp. *diversifolia* Summer holly	FSC	--	List 1B	Detected on-site as common component of chaparral habitats.
Coreopsis maritima Sea dahlia	--	--	List 2	Not detected on-site.
Corethrogyne filaginifolia var. *incana* San Diego sand aster	--	--	List 1B	Not detected on site.
Corethrogyne filaginifolia var. *linifolia* Del Mar sand aster	FPT	--	List 1B	Not detected on site.
Dichondra occidentalis Western dichondra	--	--	List 4	Detected on-site. This species is widely distributed on-site, especially on Shaw Ridge in the south of the area, and on the slopes of the Gonzales Canyon drainage in the west-center of the area.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Plants (cont.)				
Dudleya blochmaniae ssp. *brevifolia*† Short-leaved dudleya	FPE	CE	List 1B	Not detected on-site.
Dudleya variegata Variegated dudleya	FSC	--	List 2	Not detected on-site.
Eryngium aristulatum var. *parishii* San Diego button-celery	FSC	CE	List 1B	Not detected on-site.
Ferocactus viridescens Coast barrel cactus	FSC	--	List 2	Detected on-site. About 1,500 individuals are present in south-facing situations as described, at locations distributed throughout the area.
Grindelia hirsutula var. *hallii* San Diego gumplant	--	--	List 1B	Not detected on-site.
Harpagonella palmeri Palmer's grapplinghook	FSC	--	List 2	Detected on-site. This species was detected by SEB in 1993 but was not observed by NRC in 1997.
Iva hayesiana San Diego marsh-elder	FSC	--	List 2	Detected on-site. A total of 26 clumps were counted, two factors make this a low estimate: the spreading clumps likely contain several individual plants each, and more clumps are probably present in the riparian vegetation along the canyon.
Monardella linoides ssp. *viminea* Willowy monardella	FPE	CE	List 1B	Not detected on-site.
Muilla clevelandii San Diego goldenstar	FSC	--	List 1B	Detected on-site. One specimen was identified on-site in southern mixed chaparral on Santa Monica Ridge, close to the eastern boundary of the site.
Ophioglossum californicum California adder's-tongue fern	--	--	List 4	Not detected on-site.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Plants (cont.)				
Orobanche parishii ssp. *brachyloba* Short-lobed broomrape	--	--	List 1B	Not detected on-site.
Pinus torreyana ssp. *torreyana* Torrey pine	FSC	--	List 1B	Not detected on-site.
Pogogyne abramsii† San Diego mesa mint	FE	CE	List 1B	Not detected on-site.
Quercus dumosa Nuttall's scrub oak	FSC	--	List 1B	Detected on-site; this species was detected throughout the chaparral vegetation.
Selaginella cinerascens Ashy spike-moss	--	--	List 4	Detected on-site; this species was detected within the southern maritime chaparral, disturbed coastal sage scrub, and disturbed non-native grassland/coastal sage scrub communities.
Invertebrates				
Euphydryas editha quino Quino checkerspot	FE	--	--	Food plant (*Plantago erecta*) detected on site. No Quino checkerspot detected on-site
Branchinecta sandiegoensis San Diego fairy shrimp	FPE	CSA	--	Not detected on-site.
Streptocephalus woottoni Riverside fairy shrimp	FE	CSA	--	Not detected on-site.
Amphibians				
Scaphiopus hammondi Western spadefoot	FSC	CSC	SDSS	Not detected on-site.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Reptiles				
Aniella pulchra pulchra Silvery legless lizard	FSC	CSC	SDSS	Not detected on-site.
Cnemidophorus hyperythrus Orange-throated whiptail	FSC	CSC	SDSS	Detected on-site; two orange-throated whiptail were detected in 1993 within ecotonal habitats adjacent to southern willow scrub habitat and one in 1997 within coastal sage scrub.
Cnemidophorus tigris multiscutatus Coastal western whiptail	FSC	CSA	--	Not detected on-site.
Crotalus ruber ruber Northern red-diamond rattlesnake	FSC	CSC	--	Not detected on-site.
Eumeces skiltonianus interparietalis Coronado skink	FSC	CSC	--	Not detected on-site.
Diadophis punctatus similis San Diego ringneck snake	FSC	CSA	--	Not detected on-site.
Lichanura trivirgata rosafusca Coastal rosy boa	FSC	CSA	SDSS	Not detected on-site.
Phrynosoma coronatum blainvillei San Diego horned lizard	FSC	CSC	SDSS	Not detected on-site.
Salvadora hexalepis virgultea Coast patch-nosed snake	FSC	CSC	--	Not detected on-site.
Thamnophis hammondi Two-striped garter snake	FSC	CSA	SDSS	Not detected on-site.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Birds				
Accipiter cooperii Cooper's hawk	--	CSC	--	Detected on-site; this species was detected foraging over the site.
Accipiter striatus Sharp-shinned hawk	--	CSC	--	Detected on-site; this species was detected foraging over the site.
Ammodramus savannarum Grasshopper sparrow	--	--	SDSS	Detected on-site; three grasshopper sparrows were detected in 1997 within southern mixed chaparral habitat.
Aimophila ruficeps canescens S. California rufous-crowned sparrow	FSC	CSC	--	Detected on-site; this species was detected within the coastal sage scrub, disturbed coastal sage scrub, and disturbed coastal sage scrub/non-native grassland communities.
Amphispiza belli belli Bell's sage sparrow	FSC	CSC	SDSS	Detected on site; three Bell's sage sparrows were detected in 1997 within southern mixed chaparral.
Cathartes aura Turkey vulture	--	--	SDSS	Detected on-site; this species was detected foraging over the site.
Chordeiles acutipennis Lesser nighthawk	--	--	SDSS	Detected on site; this species was detected within the southern maritime chaparral.
Circus cyaneus Northern harrier	--	CSC	SDSS	Not detected on-site.
Dendroica petechia Yellow warbler	--	CSC	SDSS	Not detected on-site.
Elanus leucurus White-tailed kite	--	CSA	SDSS	Detected on-site; this species was detected foraging over the site in 1993 and 1997.
Eremophila alpestris actia California horned lark	FSC	CSC	--	Detected on-site in 1997 along the dirt roads located within coastal sage scrub community.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Birds (cont.)				
Geococcyx californianus Greater roadrunner	--	--	SDSS	Not detected on-site.
Icteria virens Yellow-breasted chat	--	CSC	SDSS	Not detected on-site.
Lanius ludovicianus Loggerhead shrike	FSC	CSC	--	Detected on-site within chaparral habitat in 1993 and 1997..
Polioptila californica californica California gnatcatcher	FT	CSC	SDSS	Two pairs detected on-site within coastal sage scrub habitats in the northwestern corner of the site in 1997. One pair and three individuals were located in the same location in 1993. Two pairs were located in the same location in the eastern portion of the site in 1993 and again in the same location in 1996.
Speotyto cunicularia hypugaea Western burrowing owl	--	CSC	SDSS	Not detected on-site.
Mammals				
Antrozous pallidus Pallid bat	--	CSC	--	Not detected on-site.
Chaetodipus fallax fallax Northwestern San Diego pocket mouse	FSC	CSC	--	Not detected on-site.
Choeronycteris mexicana Mexican long-tongued bat	FSC	CSC	--	Not detected on-site.
Euderma maculatum Spotted bat	FSC	CSC	--	Not detected on-site.

TABLE 4C-2
SENSITIVE PLANT AND WILDLIFE SPECIES DETECTED AND NOT DETECTED ON THE SUBAREA III SITE
(continued)

Species Name	Status			Occurrence Status On-Site
	USFWS	CDFG	Other*	
Mammals (cont.)				
Eumops perotis californicus Greater western mastiff bat	FSC	CSC	--	Not detected on-site.
Felis concolor Mountain lion	--	CFP	--	Not detected on-site.
Lepus californicus bennettii San Diego black-tailed jackrabbit	FSC	CSC	--	Detected on-site; this species was detected within the disturbed coastal sage scrub habitats.
Myotis evotis Long-eared myotis	FSC	--	--	Not detected on-site.
Myotis volans Long-legged myotis	FSC	--	--	Not detected on-site.
Myotis yumanensis Yuma myotis	FSC	--	--	Not detected on-site
Neotoma lepida intermedia San Diego desert woodrat	FSC	CSC	--	Not detected on-site.
Onychomys torridus ramona Southern grasshopper mouse	FSC	CSC	--	Not detected on-site.
Perognathus longimembris pacificus Pacific pocket mouse	FE	CSC	--	Not detected on-site.
Plecotus townsendii Townsend's big-eared bat	--	CSC	SDSS	Not detected on-site.

NOTE: See Table 4E-3 for explanation of sensitivity codes.

*California Native Plant Society - this designation is only applicable to plant species.
†Narrow endemic species

TABLE 4C-3
SENSITIVITY CODES

FEDERAL CANDIDATES AND LISTED PLANTS

FE = Federally listed, endangered
FT = Federally listed, threatened
FPE = Federally proposed endangered
FPT = Federally proposed threatened

STATE LISTED PLANTS

CE = State listed, endangered
CR = State listed, rare
CT = State listed, threatened

CALIFORNIA NATIVE PLANT SOCIETY

LISTS

1A = Species presumed extinct.

1B = Species rare, threatened, or endangered in California and elsewhere. These species are eligible for state listing.

2 = Species rare, threatened, or endangered in California but which are more common elsewhere. These species are eligible for state listing.

3 = Species for which more information is needed. Distribution, endangerment, and/or taxonomic information is needed.

4 = A watch list of species of limited distribution. These species need to be monitored for changes in the status of their populations.

R-E-D CODES

R (Rarity)

1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time.

2 = Occurrence confined to several populations or to one extended population.

3 = Occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported.

E (Endangerment)

1 = Not endangered
2 = Endangered in a portion of its range
3 = Endangered throughout its range

D (Distribution)

1 = More or less widespread outside California
2 = Rare outside California
3 = Endemic to California

Sensitive Plant Species-Observed

Sensitive plant species occurring or potentially occurring on the project site are summarized in Table 4C-2. This table provides the listing status and presence or potential occurrence on the subject site. The location of observed sensitive plants is shown in Figure 4C-2. The profiles below provide the listing status, distribution, habitat type, growth form, and blooming period, along with additional information on distribution and threats.

Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*). This shrub is a federally endangered species, a MSCP-covered species, and is on List 1B of the California Native Plant Society (CNPS) inventory. It is confined to sandstone bluffs in chaparral in coastal San Diego County (Carlsbad to Torrey Pines, and inland to Del Mar Mesa) and locally in adjacent northern Baja California. It is threatened by loss of chaparral habitat, partly by conversion to agriculture, but principally by development. It usually grows on north-facing slopes, and occurs on-site at 17 such locations, totaling 425 individuals. Locations include Shaw Ridge in the extreme south of the area, the slopes of the Gonzalez Canyon drainage in the west-center of the area, and the steep slopes that form the northern boundary of Pacific Highlands Ranch.

White coast ceanothus, wart-stemmed lilac (*Ceanothus verrucosus*). This shrub is a former federal Category 2 candidate, a MSCP-covered species, and is on List 2 of the CNPS inventory. It occurs in chaparral close to the coast, and ranges from Encinitas south to San Diego, and on into northern Baja California. It is threatened by loss of chaparral habitat to development. It occurs in southern maritime chaparral on-site in the southwest of the area (Shaw Ridge), and sporadically south of Gonzalez Canyon in the west-center of the area. However, the most important population is the one totaling tens of thousands of individuals, which occupies and dominates the north-facing slopes in the northeast of the area.

Summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*). This tall shrub is a former federal category 2 candidate, and is on List 1B of the CNPS inventory. It is not a MSCP-covered species. It grows on dry slopes near the coast in southern mixed chaparral, scrub oak chaparral, and southern maritime chaparral, most often in sheltered gullies, and least often on south-facing slopes. Populations range from Baja California north as far as Encinitas, and a few individuals are known from further north (Camp Pendleton to Laguna Niguel in Orange County). It is threatened principally by loss of chaparral habitat to development. Over 4,000 individuals are present on-site, in numerous populations scattered throughout suitable chaparral habitat.

San Diego barrel cactus, coast barrel cactus (*Ferocactus viridescens*). This small (less than one-foot-high) barrel cactus is a former federal Category 2 candidate, a MSCP-covered species, and is on List 2 of the CNPS Inventory. It occurs principally on dry,

sparsely vegetated, south-facing slopes in chaparral and coastal sage scrub. In California, it is confined to southwestern San Diego County, where it ranges south from Encinitas to Point Loma and Otay Mesa, and inland to Poway. It is threatened principally by development, and also by off-road vehicles. About 1,500 individuals are present on-site in south-facing situations as described, at locations distributed throughout the area. The largest single populations are on Santa Monica Ridge towards the south-center of the area, but similar numbers occupy the slopes of the Gonzalez Canyon drainage, and the canyons that cut the northern boundary of the area.

Palmer's grapplinghook (*Harpagonella palmeri*). This inconspicuous, low-growing annual is a former federal Category 2 candidate, a MSCP-covered species, and is on List 2 of the CNPS Inventory. It grows sporadically in openings in coastal sage scrub, and ranges south from Riverside and Orange Counties into Baja California and Sonora, Mexico. It is threatened by development. This species was not found during this year's surveys, but it has been encountered in the past, and the early, dry, nature of this season is probably the reason for its apparent absence.

San Diego marsh-elder (*Iva hayesiana*). This fleshy-leaved low-growing subshrub is a former federal Category 2 candidate, and is on List 2 of the CNPS Inventory. It is not a MSCP-covered species. It grows in moist or alkaline places near the coast, including along intermittent streams, ranging from Rancho Santa Fe south through San Diego to adjacent Baja California. It is threatened by waterway channelization and coastal development. On-site, this species occurs in the southern willow scrub along McGonigle Canyon in the eastern part of the area. A total of 26 clumps were counted, but two factors make this a low estimate: first, the spreading clumps likely contain several individual plants each, and second, more clumps are probably present, hidden in the dense riparian vegetation along the canyon.

San Diego golden star, Cleveland's golden star (*Muilla clevelandii*). This perennial herb, growing from a bulb, is a former federal Category 2 candidate, a MSCP-covered species, and is on List 1B of the CNPS Inventory. It grows very locally, on dry mesas and hillsides in chaparral and coastal sage scrub in southwest San Diego County and adjacent Baja California. It is threatened principally by urban development; few of its historic sites remain undeveloped. One specimen was identified on-site, in southern mixed chaparral on Santa Monica Ridge, close to the eastern boundary of the area. In wetter years, up to 15 individuals have been seen at this location.

Nuttall's scrub oak (*Quercus dumosa*). This intricately branched shrub is a former federal Category 2 candidate, a regionally sensitive species in a "southern maritime chaparral listing package" from the U.S. Fish and Wildlife Service (USFWS), and is on List 1B of the CNPS inventory. It is not a MSCP-covered species. It is the dominant species in scrub oak chaparral, and also occurs in mixed chaparral, principally on north-facing slopes. It grows only within about six miles of the coast, rarely in Orange County,

commonly from Encinitas southwards in San Diego County, and in Baja California. It is threatened by development. On-site, scrub oak chaparral is especially important in Deer Canyon in the southeast portion of the area, where it occupies the entire valley bottom and much of the north-facing slope; it also occurs in smaller stands in the valleys of the north, the west-center, and the south of the area. In all these areas, Nuttall's scrub oak is the dominant species, and scattered individuals are also more widely distributed.

Potential Vernal Pool Indicator Species

Grass poly (*Lythrum hyssopifolia*). This small introduced annual is not sensitive per se, but it is on the U.S. Army Corps of Engineers (USACE) Vernal Pool List 6A. It is a potential indicator species of vernal pools (although it can occur in other damp locations, such as intermittent creek beds). It occurs at several locations on-site, all in the intermittent creek bed of Gonzalez Canyon, or in damp places supplied by leaking agricultural irrigation water. It does not indicate vernal pools at any of these locations.

Slender woolly-heads (*Psilocarphus tenellus*). This little woolly prostrate annual is not sensitive per se, but it is on the USACE Vernal Pool List 6A. It is a potential indicator species of vernal pools. It occurs in one population, about 100 feet off-site at the southeast corner of the area. At this location it occurs in a small depression an inch or so deep and about two feet across, but no other vernal pool indicator species were observed.

Other Species of Interest

California adolphia (*Adolphia californica*). This spiny, low-growing shrub is on List 2 of the CNPS Inventory, and is not a MSCP-covered species. It occurs in dry exposed locations, especially south-facing slopes in coastal sage scrub and chaparral, in western San Diego County from Carlsbad southwards, and in adjacent Baja California. On-site, it is the dominant species in the California adolphia-dominated coastal sage scrub vegetation community, and also occurs in smaller populations in other types of coastal sage scrub, and in southern maritime chaparral and southern mixed chaparral. In these environments it is found throughout Pacific Highlands Ranch, totaling thousands of individuals.

Palmer's sagewort, San Diego sagewort (*Artemisia palmeri*). This tall perennial, growing from a woody base, is on List 2 of the CNPS Inventory. It is not a MSCP-covered species. It grows in or close to moist drainages, often within chaparral at the base of north-facing slopes adjacent to creeks. It is found only in coastal San Diego County from Encinitas southwards, and in adjacent northwestern Baja California. In California, only about 20 occurrences are known. On-site, this species occurs abundantly, with over 1,100 individuals, along the course of McGonigle Canyon and its tributaries, all the way from the extreme southwest of the area across to the eastern boundary. A few individuals were also found on the northern boundary of Pacific Highlands Ranch.

Brewer's calandrinia (*Calandrinia breweri*). This low-growing annual is on List 4 of the CNPS inventory. It grows on sandy and gravelly soil, especially on former burns. It is not a MSCP-covered species. It is widely distributed throughout coastal California, but it is uncommon everywhere, and few current records exist. One specimen was found on-site, on an open gravel area in mixed chaparral in the northwest portion of the area.

Western dichondra (*Dichondra occidentalis*). This low-growing perennial herb is a federal Category 3c species, and is on List 4 of the CNPS inventory. It is not a MSCP-covered species. It forms a ground cover below and between shrubs, principally in chaparral. It occurs only within two or three miles of the coast, and ranges from southern Orange County southwards into northern Baja California. It is widely distributed on-site, especially in the southern portion of Shaw Ridge.

California plantain (*Plantago erecta*). This small annual is not sensitive; however, it may provide habitat for the quino checkerspot butterfly (*Euphydryas editha quino*). Within the Pacific Highlands Ranch site this species grows in openings in chaparral and coastal sage scrub, and in grassland, and sometimes forms large populations. It is present on-site in 14 populations. Most of these are on the slopes of the Gonzalez Canyon drainage in the west-center of the area, but three are in the valleys along the northern boundary of the area, and one is on Shaw Ridge in the extreme southwest of the area. The quino checkerspot butterfly is not a MSCP-covered species.

Ashy spike-moss (*Selaginella cinerascens*). This tiny prostrate moss-like plant is on List 4 of the CNPS. It is not a MSCP-covered species. It carpets the ground in many openings in chaparral and coastal sage scrub, especially on flat mesa tops and gentle slopes. It is almost totally confined to coastal San Diego County and adjacent northwestern Baja California. It is ubiquitous on-site, in the habitats described above. It is especially abundant at the locations where it is marked on the map, but smaller occurrences are much too numerous to record individually.

Sensitive Wildlife Species—Observed

Eight sensitive wildlife species were observed on the Pacific Highlands Ranch property. The sensitive wildlife resources detected on the Pacific Highlands Ranch site are listed below. None of the species detected are listed by state or federal resource protection agencies as threatened or endangered.

Orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*). The orange-throated whiptail is a federal species of concern, a California species of special concern, and included on the City of San Diego Sensitive Species List. Two individuals were detected on the Pacific Highlands Ranch site. Both adult lizards were observed in open areas within chaparral and disturbed coastal sage scrub communities. It is a MSCP-covered species.

Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). The southern California rufous-crowned sparrow is a federal species of concern and a California species of special concern. Several individuals were detected within the Pacific Highlands Ranch site. This sparrow was observed in coastal sage scrub habitat in the southern portion of the site. It is a MSCP-covered species.

Turkey vulture (*Cathartes aura*). The turkey vulture is included on the City of San Diego Sensitive Species List. Three turkey vultures were observed foraging above the site in July of 1997. It is not a MSCP-covered species.

White-tailed kite (*Elanus leucurus*). The white-tailed kite is a California special animal and is included on the City of San Diego Sensitive Species List. Two individuals, possibly a breeding pair, were detected foraging over the Pacific Highlands Ranch site. It is not a MSCP-covered species.

California horned lark (*Eremophila alpestris actia*). The California horned lark is a federal species of concern, a MSCP-covered species, and a California species of special concern. Several individuals were detected along a dirt road within disturbed coastal sage scrub.

Coastal California Gnatcatcher. The site supports two areas of coastal sage scrub occupied by the coastal California gnatcatcher. Based on three years of study it appears as though these areas support at least four, and possibly five, gnatcatcher pairs. Two or three in the northwestern corner of the subarea and two on the eastern boundary. Suitable habitat for California gnatcatchers occurs along the slopes immediately adjacent to Gonzales Canyon in the western part of the site; however, no gnatcatchers have been discovered in this area. The remaining coastal sage scrub along the northern boundary of the site is not considered to be suitable for California gnatcatchers because of the limited amount and its bordering agriculture, residences, and dense chaparral. South of Black Mountain Road the highest potential for California gnatcatchers appears to be on the south-facing slopes of the ridgeline between McGonigle Canyon and Deer Canyon. However, no California gnatcatchers were found in this area during NRC's or SEB's survey. It is a MSCP-covered species.

Bell's sage sparrow. Bell's sage sparrow is a federal species of concern and can occur within both chaparral and coastal sage scrub habitats. In May of 1997, NRC located three individuals of this species in the southern portion of the Pacific Highlands Ranch site. It is not a MSCP-covered species.

San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). The San Diego black-tailed jackrabbit is a federal species of concern and a California species of special concern. NRC observed three individuals within the coastal sage scrub habitats. It is not a MSCP-covered species.

Sensitive Wildlife Species—Not Detected On-Site

There are numerous sensitive wildlife species which are known to occur within the vicinity of the study area or for which potentially suitable habitat occurs within the project site boundaries. A list of these sensitive wildlife species potentially occurring on the Pacific Highlands Ranch site, but not detected on-site is provided in Table 4C-2. The potential for the federally listed endangered quino checkerspot is low because of the disturbed nature of the habitat. Surveys for the quino checkerspot butterfly consistent with the USFWS protocol were conducted by Natural Resource Associates throughout the entire "fly period" as specified in the field protocol. Results were negative and a report documenting the survey results is attached to the Biological Resources Report (Appendix C).~~are currently being conducted during the public review period for this EIR.~~

d) Multiple Species Conservation Program (MSCP)

The MSCP is designed to identify lands that would conserve habitat for federal and state endangered, threatened, or sensitive species, including the federally listed threatened California gnatcatcher. The MSCP has been determined to be the equivalent of a Natural Community Conservation Plan for the area. The MSCP is a plan and process for the local issuance of permits under the federal and state Endangered Species Acts for impacts to threatened and endangered species.

In August 1996, the Draft MSCP Plan and related resource documents were released for public review. A final joint federal environmental impact statement and state EIR was released in January 1997 on the MSCP Plan and the MSCP was adopted by the City of San Diego in March 1997. The MSCP includes the compilation of information related to vegetation, land use, and generalized land ownership mapping and the preparation of biological standards and guidelines, a habitat evaluation model, and an analysis of the acreage necessary for a viable preserve system. The MSCP Plan also includes an implementation strategy, preserve design, and management guidelines. When adopted by local jurisdictions and approved by the U.S. Fish and Wildlife Service and CDFG, a final MSCP plan and report will be prepared.

Using the MSCP Plan as a framework plan, subarea plans may be prepared by local general-purpose agencies. The City of San Diego has prepared a subarea preserve plan to guide implementation of the MSCP Plan within its corporate boundaries. The San Diego subarea plan was adopted March 18, 1997. The project site is within the northern subarea of the City's subarea plan as part of the Future Urbanizing area preserve area. Within the northern subarea, the City proposes to "preserve two-thirds of the Los Peñasquitos Lagoon/Canyon/Del Mar Mesa core area within its jurisdiction" (City of San Diego 1996). To do so, "[p]reserve areas would be acquired or a conservation easement applied, as necessary, to assure wildlife movement and habitat restoration/protection." The

subarea plan contains a list of specific guidelines for the proposed North City FUA subarea and four of these directly apply to the proposed project area.

- C 12 Incorporate bridges to facilitate wildlife crossings (Gonzales and McGonigle Canyon areas).

- C 14 Provide fences or barriers along the edges of the shallow north/south-trending canyon that connects Carmel Valley to Gonzales Canyon to direct public access to appropriate locations.

- C 17 If this area develops or redevelops, the Multi-Habitat Planning Area (MHPA) boundary should be accommodated with the majority of the floodplain to be placed in open space and restored where possible to natural habitats.

- C 19 In the event that the MHPA configuration is not implemented pursuant to the "Pardee Settlement Agreement," then the MHPA configuration shall be per the NCFUA Framework Plan. Provide an undercrossing of San Dieguito Road for wildlife movement from Gonzales Canyon of the San Dieguito River.

The MSCP Plan identifies lands for proposed open space and habitat preservation within a MHPA. The final MSCP preserve will be located within the MHPA. The MHPA includes core areas, linkages, and sensitive species populations deemed necessary to the success of the MSCP. Under the MSCP, 85 species are considered sufficiently protected to be considered "covered" by federal and state agencies with regards to long-term conservation of the species. The MSCP EIR addresses biologic impacts, both direct and indirect, to habitats, covered species, non-covered species, and wildlife movement. In all cases, impacts were regarded as insignificant or significant and mitigated by implementation of the MSCP.

The MSCP defines core areas as those "supporting a high concentration of sensitive biological resources which, if lost or fragmented, could not be replaced or mitigated elsewhere" (City of San Diego 1996). Linkages are essential connections between biological core areas for wildlife movement.

On July 14, 1997, the City of San Diego signed an Implementing Agreement with the U.S. Fish and Wildlife Service. The Implementing Agreement is the contract between the City and the wildlife agencies, which outlines the obligations and commitments made for the successful completion of the MSCP. The agreement has been signed by all parties and is effective July 17, 1997.

The Implementing Agreement now allows the City of San Diego to issue Incidental Take Authorizations (ITAs) under the MSCP. The ITAs replace the Interim Habitat Loss 4(d)

Permit that was established in August, 1994, for permitting of "take" of the California gnatcatcher and its associated habitat, coastal sage scrub.

Biology Issues

1. Would the proposed project, including compliance with the City's Brush Management Program, result in impacts to important habitat or to sensitive plant or animal species?
2. Would implementation of the Pacific Highlands Ranch Plan result in interference with the movement of any resident or migratory wildlife species?
3. Would the project affect the long-term conservation of biological resources?

1) Issue

Would the proposed project, including compliance with the City's Brush Management Program, result in impacts to important habitat or to sensitive plant or animal species?

Impacts

a) Subarea Plan 1

Direct Impacts

Development of Subarea Plan 1, including compliance with the City's Brush Management Program, would result in the loss of natural vegetation, a reduction in wildlife habitat values, and impacts to several sensitive species populations. Construction of the proposed project would result in the development of approximately 1,159.2 acres. Implementation of the proposed project would result in the direct removal of several existing sensitive vegetation communities including the direct removal of 19 acres (17.6~~21.3~~ percent) of southern maritime chaparral, 4.0~~1~~ acres (4.6~~7~~ percent) of scrub oak chaparral, 17.4 acres (13.4 percent) of coastal sage scrub, 0.1 acre (2.3~~7~~ percent) of coyote bush scrub, 1 acre (3.9~~2~~ percent) of riparian scrub, 10.7 acres (40.4~~9.1~~ percent) of woodland, and 0.6 acre (40 percent) of native grasslands. Table 4C-4 lists these impacts by vegetation type and Table 4C-5 shows the impacts categorized by the MSCP Tier Designation for Plan 1.

As shown on Figures 4C-2 and 4C-3, 14 sensitive plants would be adversely affected by the project. They include California adolphia, Del Mar manzanita, San Diego sagewort, Brewer's calandrinia, White coast ceanothus, prostrate spineflower, summer holly,

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TABLE 4C-4
IMPACTS TO VEGETATION COMMUNITIES
ON-SITE

Vegetation Community	Existing Acres	Subarea Plan 1 Impacts	Subarea Plan 2 Impacts
Chaparral			
Chamise	46.0	6.4	6.6
Southern maritime	108.0	19.0	18.7
Southern mixed	234.1	29.2	29.8
Scrub oak chaparral	87.1	4.0	3.3
Coastal Sage Scrub			
Lemonadeberry	17.1	1.5	1.5
Black sage	63.2	7.6	7.5
California sagebrush	15.0	4.5	4.6
California Adolphia	12.2	0.2	0.2
Disturbed	8.0	1.1	1.1
Mixed-annual grassland	8.3	0.8	0.6
Mixed	6.1	1.7	1.7
Other Scrub Vegetation			
Coyote brush scrub	4.3	0.1	0.0
Riparian Scrub			
Southern willow scrub	18.4	0.8	1.1
Mule fat scrub	7.2	0.2	0.2
Coastal and valley freshwater marsh	3.0	0.0	0.0
Woodland			
Southern sycamore riparian	3.2	0.0	0.0
Eucalyptus woodlands	19.1	10.7	10.8
Pond	4.2	0.0	0.0
Grasslands			
Annual	6.0	0.0	0.0
Native	1.5	0.6	0.6
Other Vegetation			
Ruderal	123.9	58.5	58.9
Disked/agriculture	1326.3	895.0	948.7
Graded	3.6	1.0	3.5
Developed	108.3	72.8	66.1
TOTAL	2233.5	1115.7	1165.5

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TABLE 4C-5

TIER DESIGNATION IMPACTS AND MITIGATION REQUIREMENTS-PLAN 1

PARDEE

Tier Designation	MSCP Habitat Type	Development Impacts		Required MSCP Mitigation Ratios				Required Mitigation	Remaining Acreage	
		In MSCP	Out MSCP	Impact:In Mitigation:In	Impact:In Mitigation:Out	Impact:Out Mitigation:In	Impact:Out Mitigation:Out		In MSCP	Out MSCP
I	Southern maritime chaparral	13.2	1.4	2	3	1	2	27.8	41.5	4.3
I	Native grassland	0.6	0.0	2	3	1	2	1.2	-1.2	0.2
TIER I TOTAL		13.8	1.4					29.1	40.4	4.5
II	Lemonadeberry	1.4	0.0	1	2	1	1.5	1.4	12.0	0.0
II	Black sage	5.0	0.6	1	2	1	1.5	5.6	12.3	0.4
II	California sagebrush	2.3	0.0	1	2	1	1.5	2.3	0.7	0.5
II	California adolphia	0.1	0.0	1	2	1	1.5	0.1	8.7	0.0
II	Disturbed	0.7	0.4	1	2	1	1.5	1.1	5.5	-0.4
II	Mixed-annual grassland	0.8	0.0	1	2	1	1.5	0.8	6.7	0.0
II	Mixed	0.0	0.0	1	2	1	1.5	0.0	3.5	0.0
II	Coastal sage scrub	10.3	1.0	1	2	1	1.5	11.3	49.4	0.5
II	Coyote bush scrub	0.1	0.0	1	2	1	1.5	0.1	1.1	0.1
TIER II TOTAL		10.4	1.0					11.4	75.6	0.7
IIIA	Chamise chaparral	5.0	0.0	1	1.5	0.5	1	5.0	14.8	2.1
IIIA	Southern mixed chaparral	23.6	0.8	1	1.5	0.5	1	24.0	87.2	3.4
IIIA	Scrub oak chaparral	3.4	0.2	1	1.5	0.5	1	3.6	51.6	0.1
IIIA	Chaparral	32.1	1.0	1	1.5	0.5	1	32.6	153.5	4.6
TIER IIIA TOTAL		32.1	1.0					32.6	153.5	5.1
IIIB	Annual grassland	0.0	0.0	1	1.5	0.5	1	0.0	5.8	0.0
TIER IIIB TOTAL		0.0	0.0					0.0	5.8	0.0
SUBTOTAL								73.1	250.36	10.62
N/A	Southern sycamore riparian woodlands	0.0	0.0	2	2	2	2	0.0	2.2	0.0
N/A	Southern willow scrub	0.4	0.4	2	2	2	2	1.6	14.2	0.3
N/A	Mule fat scrub	0.0	0.0	2	2	2	2	0.0	5.7	0.0
N/A	Coastal & valley freshwater marsh	0.0	0.0	2	2	2	2	0.0	1.5	0.0
WETLAND TOTAL		0.4	0.4					1.6	23.5	0.1
IV	Eucalyptus woodlands	0.3	0.7	0	0	0	0	0.0	5.1	0.0
IV	Ruderal	4.3	2.9	0	0	0	0	0.0	17.1	1.8
IV	Disked/agricultural	88.3	712.1	0	0	0	0	0.0	349.4	38.3
IV	Graded	0.0	1.0	0	0	0	0	0.0	2.5	0.1
IV	Developed	0.2	0.0	0	0	0	0	0.0	9.1	1.1
OTHER VEGETATION TOTAL		93.1	716.7					0.0	383.1	41.3
TOTAL		149.8	720.4	0.0	0.0	0.0	0.0	74.7	657.0	52.0

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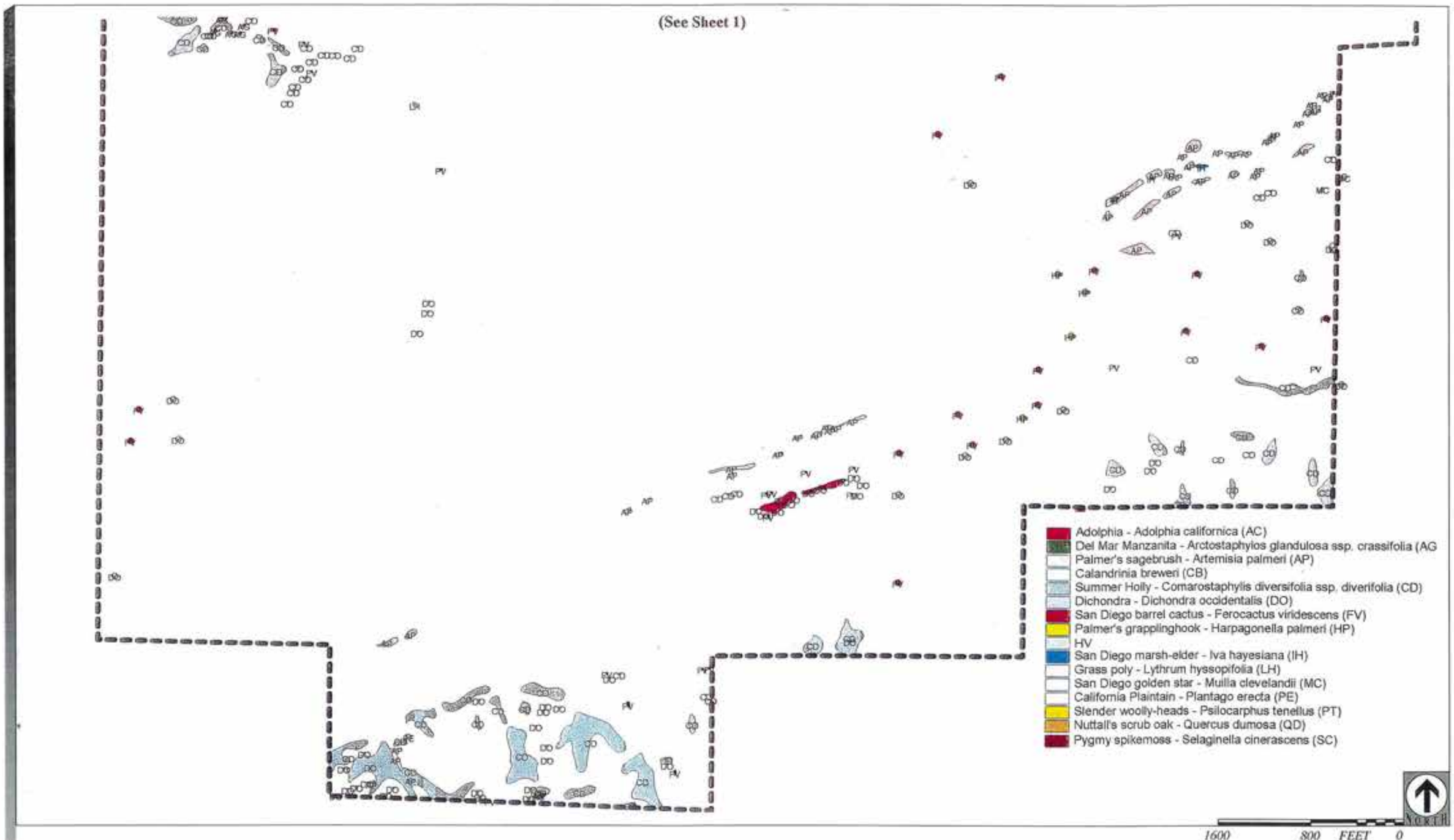
TABLE 4C-6

TIER DESIGNATION IMPACTS AND MITIGATION REQUIREMETNS-PLAN I
NON-PARDEE

Tier Designation	MSCP Habitat Type	Development Impacts		Required MSCP Mitigation Ratios				Required Mitigation	Remaining Acreage	
		In MSCP	Out MSCP	Impact:In Mitigation:In	Impact:In Mitigation:Out	Impact:Out Mitigation:In	Impact:Out Mitigation:Out		In MSCP	Out MSCP
I	Southern maritime chaparral	0.0	4.4	2	3	1	2	8.8	15.0	-8.8
I	Native grassland	0.0	0.0	2	3	1	2	0.0	0.6	0.0
TIER I TOTAL		0.0	4.4					8.8	15.6	8.8
II	Lemonadeberry	0.0	0.1	1	2	1	1.5	0.2	2.1	-0.1
II	Black sage	0.0	2.0	1	2	1	1.5	3.0	37.1	-3.0
II	California sagebrush	0.0	2.2	1	2	1	1.5	3.3	6.9	3.3
II	California adolphia	0.0	0.1	1	2	1	1.5	0.2	3.3	-0.2
II	Disturbed	0.0	0.0	1	2	1	1.5	0.0	0.6	0.0
II	Mixed-annual grassland	0.0	0.0	1	2	1	1.5	0.0	0.0	0.0
II	Mixed	0.0	1.7	1	2	1	1.5	2.6	0.8	-2.5
II	Coastal sage scrub	0.0	6.0	1	2	1	1.5	9.2	50.7	-9.2
II	Coyote bush scrub	0.0	0.0	1	2	1	1.5	0.0	2.8	0.0
TIER II TOTAL		0.0	6.0					9.2	53.6	-9.2
IIIA	Chamise chaparral	0.0	1.4	1	1.5	0.5	1	1.4	18.0	-0.7
IIIA	Southern mixed chaparral	0.0	4.8	1	1.5	0.5	1	4.8	89.2	4.1
IIIA	Scrub oak chaparral	0.0	0.4	1	1.5	0.5	1	0.4	26.5	0.9
IIIA	Chaparral	0.0	6.6	1	1.5	0.5	1	6.6	133.7	-3.9
TIER IIIA TOTAL		0.0	6.6					6.6	133.7	-3.9
IIIB	Annual grassland	0.0	0.0	1	1.5	0.5	1	0.0	0.0	0.0
TIER IIIB TOTAL		0.0	0.0					0.0	0.0	0.0
SUBTOTAL								24.5	202.8	-21.8
N/A	Southern willow scrub	0.0	0.0	2	2	2	2	0.0	0.2	1.6
N/A	Mule fat scrub	0.0	0.2	2	2	2	2	0.4	1.3	-0.4
N/A	Coastal & valley freshwater marsh	0.0	0.0	2	2	2	2	0.0	1.4	0.0
N/A	Southern sycamore riparian woodlands	0.0	0.0	2	2	2	2	0.0	1.0	0.0
N/A	Pond	0.0	0.0	2	2	2	2	0.0	4.2	0.0
WETLAND TOTAL		0.0	0.2					0.4	8.1	1.2
IV	Eucalyptus woodlands	0.0	9.7	0	0	0	0	0.0	3.2	0.1
IV	Ruderal	0.0	51.3	0	0	0	0	0.0	25.7	20.8
IV	Disked/Agricultural	0.0	94.6	0	0	0	0	0.0	45.7	0.0
IV	Graded	0.0	0.0	0	0	0	0	0.0	0.0	0.0
IV	Developed	0.0	72.6	0	0	0	0	0.0	25.3	0.0
OTHER VEGETATION TOTAL		0.0	228.2					0.0	97.8	20.9
TOTAL			245.3					24.9	308.8	0.3

(See Sheet 1)



Source: Project Design Consultants, 1997

FIGURE 4C-3

Sensitive Plant Species Southern Portion

western dichondra, coast barrel cactus, Palmer's grapplinghook, San Diego marsh-elder, San Diego golden star, Nuttall's scrub oak, and ashy (pygmy spikemoss). Impacts to the federally endangered Del Mar manzanita would also result from implementation of Plan 1. Eleven small groups of Del Mar manzanita supporting a total of 425 individuals would be removed.

As shown in Table 4C-2, several sensitive animal species would be adversely affected by the project. They include coastal California gnatcatcher, grasshopper sparrow, southern California rufous-crowned sparrow, Bell's sage sparrow, California horned lark, loggerhead shrike, Cooper's hawk, sharp-shinned hawk, turkey vulture, white-tailed kite, and orange-throated whiptail. Specifically, one pair of coastal California gnatcatchers found on the northwestern corner of the project site. Two orange-throated whiptail lizards were observed on-site in 1993, and it is anticipated that other individuals of this species would be affected by project implementation.

Implementation of the proposed project would directly affect habitat occupied by the above-listed bird species and affect foraging, perching, and, potentially, nesting habitats used by a variety of raptor species. No raptor nests were discovered on-site and project implementation is not anticipated to affect breeding of local raptors.

Third Party Beneficiary Status

Third Party Beneficiary Status shall be granted with adoption of the Pacific Highlands Ranch Subarea Plan provided the assurances in the MSCP Implementing Agreement are satisfied. The issuance of any permit by the City of San Diego does not authorize the applicant to violate any federal, state, or City laws, ordinances, regulations, or policies including, but not limited to, the federal Endangered Species Act of 1973 and any amendments thereto (16 U.S.C. Section 1531 et seq.).

In accordance with authorization granted to the City of San Diego from the USFWS pursuant to Section 10(a) of the Endangered Species Act and by the CDFG pursuant to Fish and Game Code section 2835 as part of the Multiple Species Conservation Program (MSCP), the City of San Diego through the issuance of this permit hereby confers upon permittee the status of Third-Party Beneficiary as provided for in Section 17 of the City of San Diego Implementing Agreement, executed on July 17, 1997 and on file in the Office of the City Clerk as Document No. RR-00-18394. Third-Party Beneficiary status is conferred upon permittee by the City:

1. To grant permittee the legal standing and legal right to utilize the take authorizations granted to the City pursuant to the MSCP within the context of those limitations imposed under this permit and the Implementing Agreement, and

2. To assure Permittee that no existing mitigation obligation imposed by the City of San Diego pursuant to this permit shall be altered in the future by the City of San Diego, USFWS, or CDFG, except in the limited circumstances described in Section 9.6 and 9.7 of the Implementing Agreement.

If mitigation lands are identified but not yet dedicated or preserved in perpetuity, maintenance and continued recognition of Third-Party Beneficiary status by the City is contingent upon permittee maintaining the biological values of any and all lands committed for mitigation pursuant to this permit and of full satisfaction by permittee of mitigation obligations required by this permit, as described in accordance with Section 17.1D of the Implementing Agreement. Third-party beneficiary status may be achieved through conveyance of land or recordation of an easement as described in the Pacific Highlands Ranch Subarea Plan.

Indirect Effects

Indirect impacts are those impacts that occur at a later time (e.g., after the development project is complete). Possible factors that could contribute to indirect effects on the animal species remaining in the open space areas include noise, light, presence of humans and horses, predation from domestic pets, and habitat isolation, including dispersal corridors.

Noise impacts to wildlife species may occur during construction, causing animals to avoid areas where noise levels are the highest. This would be a temporary impact which could be minimized for bird species by restricting brush clearing and grubbing to the nonbreeding season. Once construction is complete, ambient noise levels from the occupied housing development would not be at a level (i.e., greater than 60 A-weighted decibels) that would adversely affect wildlife within the open space areas.

Since construction would occur during the daylight hours, no lighting impacts to wildlife species are anticipated. Light emanating from the completed subarea would include outdoor lighting from homes, street lights, and lighting at the mixed use core commercial area, community park, and school sites. None of these sources would illuminate habitat in the center of open space areas to a level that would affect wildlife.

Outside of the development itself, human encroachment into the majority of the open space areas would be somewhat limited by steep slopes and dense vegetation cover. Typically, wildlife species occupying smaller (less than 50 acres), more isolated areas of the open space are affected by an increase in human activity in the habitat.

Potential impacts from domestic pets entering the open space area would be primarily from cats. Although small mammals, chiefly rodents, make up over 50 percent of the prey taken, up to 25 percent can comprise birds (Fitzgerald 1988). Domestic cats would

hunt less and spend less time hunting than feral cats, since they are receiving supplemental food (Turner and Meister 1988). Male feral cats are more wide-ranging and hunt more than female cats, domestic or feral (Liberg 1980). In general, the prey taken is dependent on the seasonal abundance of the prey, as cats are opportunistic hunters and tend to hunt prey that is readily available (i.e., rodents, rabbits). Cats also tend to hunt in open grassy areas. The low abundance of coastal California gnatcatchers and the preferred nesting in shrubby areas would appear to be an advantage, since cats would be more likely to encounter other bird species and hunt in more open areas; however, gnatcatchers nest low to the ground, increasing the risk of being discovered.

The majority of the cats in the newly developed area would be domestic and the adjacent open space areas are covered with thick brush. The magnitude of any indirect impacts to wildlife in open space areas is not quantifiable and will depend on the density of cats, their owner's habits, and how many go feral. However, it is anticipated that the greatest influence by domestic cats would be restricted to areas adjacent to homes (i.e., open fuel breaks) which typically form the center of their range.

Habitat loss from changes in fire frequency, installation of fuel breaks, removal by residents, and trampling by equestrian trails can affect both plant and animal species in fragmented open space areas (Alberts et al. 1993; Bolger, Alberts, and Soule 1991). All of these factors tend to open the habitat through disturbance, increasing the probability of colonization by ruderal weeds and ornamental plantings. Less habitat means fewer wildlife species that can be supported. Again, small habitat fragments are more susceptible to these effects than larger fragments.

Development of Subarea Plan 1 without mitigation measures could potentially impact San Dieguito or Los Peñasquitos Lagoons. Erosion and soil loss associated with grading without controls could result in silt entering the lagoon systems. Siltation in the lagoons resulting from soil loss on surrounding land is currently a principal factor causing reduction in wetland habitat values within the lagoons. Silt can bury small invertebrate animals that other animals depend upon for food, and can alter tidal influence in the lagoon.

b) Subarea Plan 2

Development of Subarea Plan 2, including compliance with the City's Brush Management Program, would result in a loss of natural vegetation, a reduction in wildlife habitat values, and impacts to several sensitive species populations. Specifically, construction of the proposed project would result in the development of approximately 1,258.2 acres. As listed in Table 4C-4, implementation of the proposed project would result in the direct removal of several existing sensitive vegetation communities including the direct removal of 18.7 acres (17.32+ percent) of southern maritime chaparral, 3.3+ acres (3.86 percent) of scrub oak chaparral, 17.2 acres (13.22-8 percent) of coastal sage scrub, 1.3 acres (5.14.2

percent) of riparian scrub, 10.8 acres (40.79.5 percent) of woodland, and 0.6 acre (40 percent) of native grasslands. Table 4C 6 shows the impacts categorized by the MSCP Tier Designation for Plan 2.

Indirect impacts would be similar to that of development of Subarea Plan 1.

c) Carmel Valley Neighborhood 10 Precise Plan

As noted in the Project Description (see Figures 3-5 and 3-6), another component of the proposed MHPA boundary adjustment includes encroachment into previously designated open space within the Neighborhood 10 Precise Plan. This additional MHPA encroachment would result in a loss of approximately 8.1 acres of Tier II and Tier III habitats (2.6 acres of coastal sage scrub and 4.5 acres on non-native grasslands). The land being impacted is not within a wildlife corridor and is within a central east-west trending canyon which has approved development on three sides.

Significance of Impacts

a) Subarea Plan 1

The direct, indirect, and cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (13.2 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.34 acres of coastal sage scrub and 0.1 acre of coyote bush scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.4 acre), and impacts to the above-identified sensitive plant and animal species.

b) Subarea Plan 2

The direct, indirect, and cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (12.9 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.10 acres of coastal sage scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.7 acre), and impacts to the above-identified sensitive plant and animal species.

c) Both Plans

Although both plans would meet the MSCP requirements, cumulative wetland impacts would remain significant.

d) Carmel Valley Neighborhood 10 Precise Plan

The impacts to coastal sage scrub and non-grasslands would be a significant impact.

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TABLE 4C-6

TIER DESIGNATION IMPACTS AND MITIGATION REQUIREMENTS-PLAN 2

PARDEE

Tier Designation	MSCP Habitat Type	Development Impacts		Required MSCP Mitigation Ratios				Required Mitigation	Remaining Acreage	
				Impact:In Mitigation:In	Impact:In Mitigation:Out	Impact:Out Mitigation:In	Impact:Out Mitigation:Out			
		In MSCP	Out MSCP						In MSCP	Out MSCP
I	Southern maritime chaparral	12.9	1.4	2	3	1	2	27.2	42.5	4.3
I	Native grassland	0.6	0.0	2	3	1	2	1.2	-1.2	0.2
TIER I TOTAL		13.5	1.4					28.4	41.3	4.4
II	Lemonadeberry	1.4	0.0	1	2	1	1.5	1.4	12.1	0.0
II	Black sage	4.9	0.6	1	2	1	1.5	5.5	12.5	0.9
II	California sagebrush	2.4	0.0	1	2	1	1.5	2.4	0.6	0.5
II	California adolphia	0.1	0.0	1	2	1	1.5	0.1	8.7	0.0
II	Disturbed	0.7	0.4	1	2	1	1.5	1.1	5.4	-0.2
II	Mixed-annual grassland	0.6	0.0	1	2	1	1.5	0.6	7.1	0.0
II	Mixed	0.0	0.0	1	2	1	1.5	0.0	3.5	0.0
II	Coastal sage scrub	10.1	1.0	1	2	1	1.5	11.1	50.0	1.0
II	Coyote bush scrub	0.0	0.0	1	2	1	1.5	0.0	1.4	0.1
TIER II TOTAL		10.1	1.0					11.1	51.3	1.0
IIIA	Chamise chaparral	5.2	0.0	1	1.5	0.5	1	5.2	14.5	1.1
IIIA	Southern mixed chaparral	24.2	0.8	1	1.5	0.5	1	24.6	86.0	5.8
IIIA	Scrub oak chaparral	2.7	0.3	1	1.5	0.5	1	2.8	53.1	0.1
IIIA	Chaparral	32.1	1.1	1	1.5	0.5	1	29.9	100.4	4.8
TIER IIIA TOTAL		32.1	1.1					29.9	100.4	4.8
IIIB	Annual grassland	0.0	0.0	1	1.5	0.5	1	0.0	5.8	0.0
TIER IIIB TOTAL		0.0	0.0					0.0	5.8	0.0
SUBTOTAL								69.5	299.2	10.3
N/A	Southern willow scrub	0.7	0.4	2	2	2	2	2.2	13.3	0.1
N/A	Mule fat scrub	0.0	0.0	2	2	2	2	0.0	5.7	0.0
N/A	Coastal & valley freshwater marsh	0.0	0.0	2	2	2	2	0.0	1.5	0.0
N/A	Southern sycamore riparian woodlands	0.0	0.0	2	2	2	2	0.0	2.2	0.0
WETLAND TOTAL		0.7	0.4					2.2	22.6	0.1
IV	Eucalyptus woodlands	0.4	0.7	0	0	0	0	0.0	5.0	0.0
IV	Ruderal	4.8	2.9	0	0	0	0	0.0	16.6	1.8
IV	Disked/Agricultural	147.9	712.1	0	0	0	0	0.0	289.7	38.3
IV	Graded	2.5	1.0	0	0	0	0	0.0	0.0	0.1
IV	Developed	0.2	0.7	0	0	0	0	0.0	9.1	0.4
OTHER VEGETATION TOTAL		155.8	717.4					0.0	320.4	40.6
TOTAL		212.2	721.3					71.7	542.0	51.0

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TABLE 4C-6

TIER DESIGNATION IMPACTS AND MITIGATION REQUIREMENTS-PLAN 2

NON-PARDEE

Tier Designation	MSCP Habitat Type	Development Impacts		Required MSCP Mitigation Ratios				Required Mitigation	Remaining Acreage	
		In MSCP	Out MSCP	Impact:In Mitigation:In	Impact:In Mitigation:Out	Impact:Out Mitigation:In	Impact:Out Mitigation:Out		In MSCP	Out MSCP
I	Southern maritime chaparral	0.0	4.4	2	3	1	2	8.8	25.0	-8.8
I	Native grassland	0.0	0.0	2	3	1	2	0.0	0.6	0.0
TIER I TOTAL		0.0	4.4					8.8	15.6	-8.8
II	Lemonadeberry	0.0	0.1	1	2	1	1.5	0.2	2.1	-0.1
II	Black sage	0.0	2.0	1	2	1	1.5	3.0	57.1	-3.0
II	California sagebrush	0.0	2.2	1	2	1	1.5	3.3	6.9	-3.3
II	California adolphia	0.0	0.1	1	2	1	1.5	0.2	3.3	-0.2
II	Disturbed	0.0	0.0	1	2	1	1.5	0.0	0.6	0.0
II	Mixed-annual grassland	0.0	0.0	1	2	1	1.5	0.0	0.0	0.0
II	Mixed	0.0	1.7	1	2	1	1.5	2.6	0.8	-2.5
II	Coastal sage scrub	0.0	6.1	1	2	1	1.5	9.2	50.7	-9.2
II	Coyote bush scrub	0.0	0.0	1	2	1	1.5	0.0	2.	0.0
TIER II TOTAL		0.0	6.1					9.2	53.6	-9.2
IIIA	Chamise chaparral	0.0	1.4	1	1.5	0.5	1	1.4	18.0	-0.7
IIIA	Southern mixed chaparral	0.0	4.8	1	1.5	0.5	1	4.8	89.2	-4.8
IIIA	Scrub oak chaparral	0.0	0.4	1	1.5	0.5	1	0.4	26.5	0.9
IIIA	Chaparral	0.0	6.6	1	1.5	0.5	1	6.6	133.7	-3.9
TIER IIIA TOTAL		0.0	6.6					6.6	133.7	-3.9
IIIB	Annual grassland	0.0	0.0	1	1.5	0.5	1	0.0	0.0	0.0
TIER IIIB TOTAL		0.0	0.0					0.0	0.0	0.0
SUBTOTAL								24.5	202.8	-21.9
N/A	Southern willow scrub	0.0	0.0	2	2	2	2	0.0	0.2	1.6
N/A	Mule fat scrub	0.0	0.2	2	2	2	2	0.4	1.3	-0.4
N/A	Coastal & valley freshwater marsh	0.0	0.0	2	2	2	2	0.0	1.4	0.0
N/A	Southern sycamore riparian woodlands	0.0	0.0	2	2	2	2	0.0	1.0	0.0
N/A	Pond	0.0	0.0	2	2	2	2	0.0	4.2	0.0
WETLAND TOTAL		0.0	0.2					0.4	8.1	1.3
IV	Eucalyptus woodlands	0.0	9.7	0	0	0	0	0.0	3.2	0.1
IV	Ruderal	0.0	51.2	0	0	0	0	0.0	25.7	20.9
IV	Disked/agricultural	0.0	88.7	0	0	0	0	0.0	43.7	5.9
IV	Graded	0.0	0.0	0	0	0	0	0.0	0.0	0.0
IV	Developed	0.0	65.2	0	0	0	0	0.0	25.3	7.4
OTHER VEGETATION TOTAL		0.0	214.8					0.0	97.8	34.3
TOTAL		0.0	232.0					24.9	308.8	13.7

Mitigation, Monitoring, and Reporting

The significant direct and indirect impacts to upland biological resources would be mitigated to below a level of significance through conformance and implementation of the MSCP. The Pacific Highlands Ranch MSCP impacts and mitigation requirements are shown in Tables 4C-5 and 4C-6. Table 4C-5 shows the mitigation requirements for Plan 1 and Table 4C-6 shows the mitigation requirements for Plan 2. These tables separate the mitigation requirements for the Pardee ownership and the non-Pardee ownerships. The identified mitigation ratios are per the adopted MSCP based on the vegetation type (Tier Designation) being impacted. As these tables indicate, there is adequate acreage on-site to mitigate for Pardee's direct impacts within Pacific Highlands Ranch. There is also adequate acreage within Subarea III to mitigate for the 8.1 acres of impacts into Tier II and Tier III habitats previously designated as open space within Carmel Valley Neighborhood 10 Precise Plan. Approximately 16.2 acres of Tier II and III habitats would be required to mitigate impacts within Neighborhood 10. Other mitigation requirements identified to deal with direct and indirect impacts would be implemented at the time future tentative maps are processed and would include the following:

1. Staking and monitoring of grading activities shall be supervised by a qualified biologist to ensure no unanticipated impacts to sensitive habitats or species occur within the areas shown for permanent open space. This requirement should be noted on the grading plans prior to the issuance of a grading permit.

2. Brush management for Zone 2 shall be implemented as required by the City and shall be the responsibility of the adjacent landowner.

3. Lighting at perimeter lots adjacent to the open space shall be selectively placed, shielded, and directed away from that habitat.

4. Any fencing along property boundaries facing the open space corridors shall be designed and constructed of materials that are compatible with the open space corridors. Fencing shall be installed by the developer prior to the occupancy of the units in order to ensure uniformity. Locations where fencing are required are described in the Subarea Plan.

5. Restrictions for noise impacts on grading of lands adjacent to the MHPA consistent with the MSCP Subarea Plan should be implemented during the gnatcatcher breeding season. Grading inside the MHPA preserve or within 100 feet of the MHPA is prohibited during gnatcatcher breeding season. Grading can occur on land that was previously cleared.

Wetland impacts under both Plan 1 and Plan 2 would be mitigated through the creation/restoration within the Pacific Highland Ranch project site. Portions of the drainage bottoms with Deer Canyon and McGonigle Canyon have been disturbed by agricultural operations and can be utilized to accomplish wetland mitigation requirements on-site. Wetland restoration, at a ratio consistent with the MSCP, is a component in the conceptual revegetation plan prepared in conjunction with the mitigation land bank (see discussion below).

Other mitigation measures provided as extraordinary benefit to the City, negotiated as part of a contemplated development agreement for Subarea III would be the dedication of lands within Subarea V and the Carmel Valley community planning area. At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 75 acres of Tier I habitat would be added to the MHPA. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. Additionally, future development potential at the Deer Canyon parcel within Subarea V would be avoided. Finally, Pardee Homes has agreed to other provisions which would further enhance the MHPA function. These measures consist of the following:

1. No brush management activities would be performed within the preserve along the edges of several of the proposed encroachment areas as described in the Subarea Plan. Zone 2 brush management would be allowed in other areas of the MHPA.

2. All manufactured slopes along the edge of the MHPA would be included within the MHPA and would be revegetated in accordance with a Master Revegetation Plan.

3. Impacts to wetlands would be minimized, and mitigation would be per City Ordinance and the U.S. Army Corps of Engineers 404 Permit requirements.

4. Approximately 100 acres of disturbed land within the MHPA for Pacific Highlands Ranch would be restored per a Master Revegetation Plan with appropriate upland and wetland habitats and a mitigation bank established. Much of this revegetation area consists of a manufactured wildlife corridor that would connect and provide for wildlife movement between Gonzales Canyon and McGonigle Canyon.

5. Conveyance of acreage within Carmel Valley Neighborhood 8A and Subarea V (Deer Canyon).

Prior to the issuance of grading permits in conjunction with future tentative map approvals, Development Services shall review the grading and landscape plans for consistency with the mitigation measures for impacts to biological resources (grading and

brush management). The above measures would be conditions of future development permits and landscape plans. After completion of grading and prior to the issuance of building permits, a site inspection by City staff would be required to ensure compliance with the brush management mitigation program.

Mitigation Land Banks

In order to effectuate the boundary adjustments to the MHPA, a mitigation bank would be established over approximately 100 acres of land within the Pardee ownership in Pacific Highlands Ranch. The bank will consist of disturbed land that will be revegetated in accordance with the master revegetation plan. Restored habitats will consist of appropriate wetland and upland habitats. It is anticipated that much of the upland habitat would consist of Tier II and Tier III habitats. The City will direct project applicants needing mitigation in the North City area to purchase credits in this bank, and will accept land from this bank into the MHPA upon purchase of credits by a third party. The bank will be processed and approved expeditiously by the City in a manner that will enable establishment costs to be kept to a minimum.

For areas to be restored, a conceptual revegetation summary which outlines the general criteria and maintenance requirements to be included in a more detailed master revegetation plan for Pacific Highlands Ranch is included as Appendix C2 to this EIR. Restored lands included in the mitigation bank would be maintained as required in the master revegetation plan until credits are sold and the land conveyed to the City for MHPA purposes. Upon conveyance, the City would assume responsibility for management and maintenance.

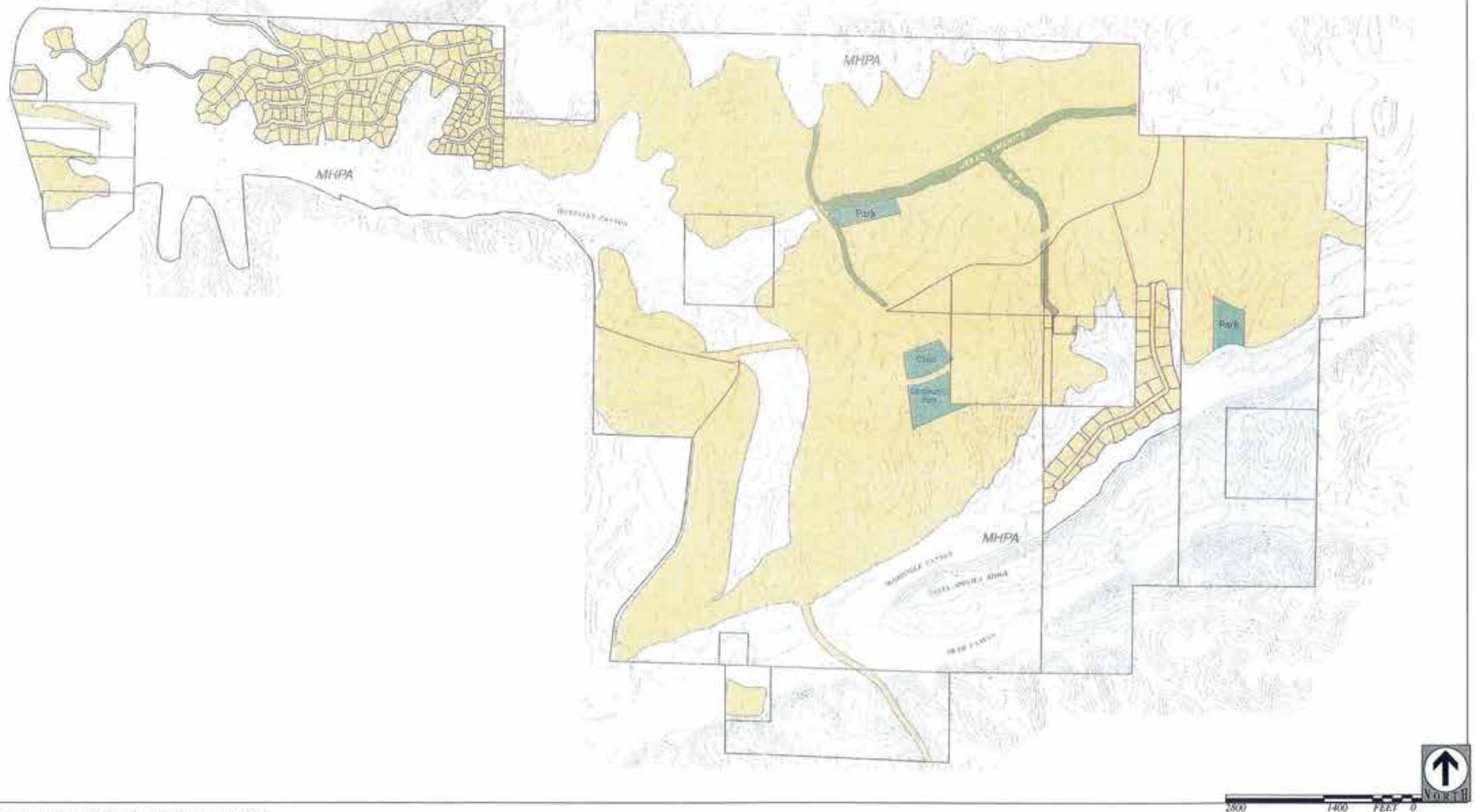
A mitigation bank covering approximately 2420 ~~20~~ acres within Parcel A of Carmel Valley Neighborhood 8A would also be established as a component of the MHPA boundary adjustment process.

2) Issue

Would implementation of the Pacific Highlands Ranch Plan result in interference with the movement of any resident or migratory wildlife species?

Impacts

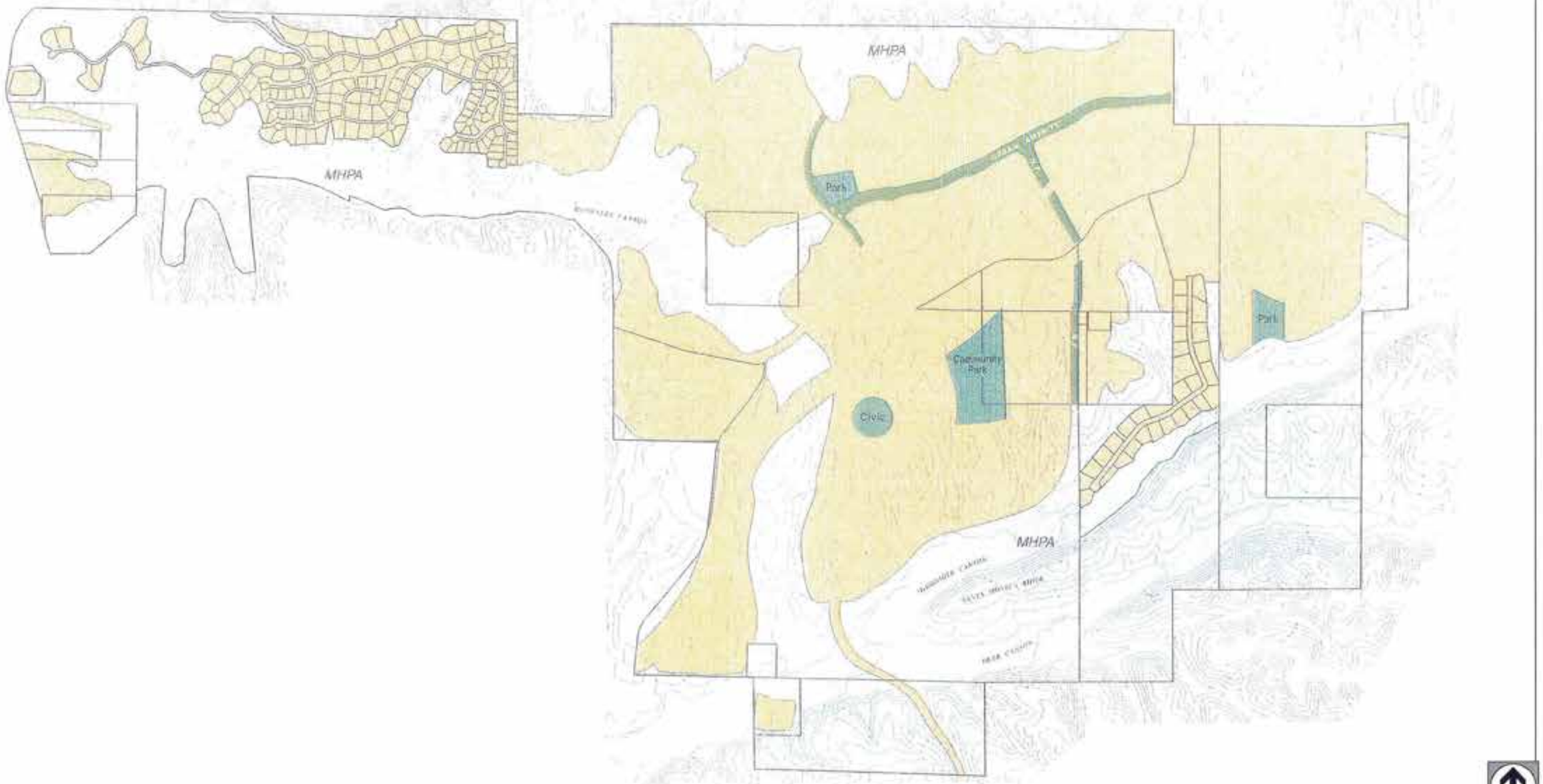
The major regional movement corridors within the NCFUA were identified during the MSCP planning process and were incorporated into the MHPA design for both Plans 1 and Plan 2 (Figures 4C-4 and 4C-5). Specifically, the MHPA under both plans incorporates the two major wildlife corridors envisioned for the project site in the MSCP Subarea Plan (i.e., McGonigle Canyon corridor and north-south linkage corridor). The



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 4C-4

MHPA Design Subarea Plan 1



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 4C-5

MHPA Design Subarea Plan 2

corridor widths (1,000 feet on average) and bridges/undercrossing associated with roadways crossing the corridors have also been accommodated in both plans.

Significance of Impacts

Because both Subarea Plans 1 and 2 accommodate the wildlife corridors identified in the MSCP (i.e., McGonigle Canyon, Gonzales Canyon, and the north-south linkage between the two), the impacts on wildlife movement from implementation of the Pacific Highlands Ranch Plan would not be significant.

Mitigation Monitoring and Reporting

No mitigation would be required other than the City's management and monitoring responsibilities as described in the MSCP.

3) Issue

Would the project affect the long-term conservation of biological resources?

Impacts

The MHPA in Pacific Highlands Ranch is largely comprised of regional linkages leading to off-site biological core areas within existing reserves and parks. Pacific Highlands Ranch includes portions of major linkages or corridors which lie in canyons or drainages (e.g., La Zanja Canyon, McGonigle Canyon, and Gonzales Canyon), the majority of which require restoration to enhance their long-term habitat value. Specifically, the City of San Diego MSCP Subarea Plan with respect to the NCFUA states the following: "Subareas III and IV contain only extended regional corridors, linking to the north west and south." The actual acreage of sensitive vegetation types and the numbers of "covered" plant and animal species within Pacific Highlands Ranch is minimal. Narrow endemic species were not observed within the subarea.

Subarea Plans 1 and 2. The projects' consistency with the MSCP Subarea Plan policies and guidelines are addressed in the Land Use section of the EIR, Chapter 4A. Both of the proposed subarea plans would contribute to the maintenance of biological diversity in the region through the establishment of an MHPA which is "functionally equivalent" with the system of wildlife corridors and habitat areas described in the MSCP. Both plans accommodate the realignment of SR-56 out of the MHPA, which reduces the impacts that would otherwise result from habitat fragmentation. Both plans incorporate an adjustment to the MHPA. The on-site open space system would preserve sensitive habitats (i.e., coastal sage scrub and southern mixed chaparral) and major wildlife corridors south of

SR-56 (i.e., Deer and McGonigle Canyons and Santa Monica Ridge) and provide the required northerly linkage/wildlife corridor via a north-south tributary canyon to Gonzales Canyon. This north-south corridor is currently disturbed grasslands and would function as part of the regional wildlife preserve system. Gonzales Canyon proceeds westerly through the Del Mar Highlands Estates PRD property and drains into the San Dieguito River valley. Undercrossings would be proposed beneath SR-56 and Del Mar Heights Road to facilitate wildlife movement. Additionally, the steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also be a component of the natural open space system. Retention of these slopes would preserve the large contiguous block of southern maritime chaparral which exists on the site.

The MHPA boundary would also be adjusted at locations outside of Pacific Highlands Ranch. Specifically, the MHPA boundary within Carmel Valley Neighborhoods 8A and 10 would be modified while development potential on approximately 15 acres within the MHPA within Subarea V (Deer Canyon) would be removed. Within Neighborhood 10, the minor adjustment would result in removal of approximately 8.1 acres of Tier II and Tier III habitats (coastal sage scrub and grasslands). The land being removed from the MHPA is not within a wildlife corridor and is within a central east-west canyon which has approved development on three sides. This area is not part of a large contiguous block of undisturbed habitat. This modification would not affect the function of the preserve in Neighborhood 10.

At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 75 acres of Tier I habitat would be added to the MHPA. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. The addition of a relatively large block of mostly Tier I habitat within Carmel Valley Neighborhood 8A would result in a MHPA that would be functionally equivalent ~~superior~~ to that shown in the MSCP Subarea Plan.

Overall, the reduction in the MHPA in both Pacific Highlands Ranch and Carmel Valley Neighborhood 10 is offset by increases to the MHPA in Carmel Valley Neighborhood 8A and the NCFUA Subarea V (Deer Canyon parcel). The proposed adjustment areas would remove largely disturbed land from the MHPA (Pacific Highlands Ranch and Carmel Valley Neighborhood 10), increase the preservation of rare Tier I resources (Carmel Valley Neighborhood 8A Parcels A and B), and remove the potential for development within the MHPA (15 acres within Subarea V Deer Canyon parcel and 75 acres within Neighborhood 8A).

Several plant and animal species covered under the City's Take Authorization occur within the subarea. Four MSCP-covered plant species occur within Pacific Highlands

Ranch: Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), coast barrel cactus (*Ferocactus viridescens*), San Diego golden star (*Muilla clevelandii*), and wart-stemmed ceonothus. These plants all occur within preserve areas that are to be deeded to the City of San Diego or the San Dieguito River Park Joint Powers Authority for long term management. One reptile species, the orange-throated whiptail, was observed within the subarea. Management actions directed to this species include using drought-tolerant plantings, restoration of coastal sage scrub, and discouraging frequent irrigation within and around the perimeter of the preserve and minimizing edge effects. Two species of birds covered by the MSCP were observed: southern California rufous-crowned sparrow and the California gnatcatcher. Of concern for each is avoidance of active nests and maintenance and/or restoration/revegetation of coastal sage scrub habitat.

Significance of Impacts

Subarea Plans 1 and 2. Both subarea plans would provide for a regional open space system that is functionally equivalent with the MHPA proposed in the adopted MSCP.

No significant adverse effects to biological diversity would result through implementation of either Subarea Plan.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. No mitigation would be required.

D. Hydrology/Water Quality

Existing Conditions

a) Surface Hydrology

Pacific Highlands Ranch is located within two adjacent hydrographic units (Figure 4D-1): that portion of the subarea approximately north of Black Mountain Road is in the San Dieguito Hydrographic Unit (HU) and that portion south of Black Mountain Road is in the Peñasquitos HU. Pacific Highlands Ranch can be further divided into four primary watersheds: the La Zanja and Gonzales Canyons in the San Dieguito HU, and McGonigle and Deer Canyons in the Peñasquitos HU. La Zanja and Gonzales Canyons drain the northern portion of Pacific Highlands Ranch and drain west into the San Dieguito River, which flows to the San Dieguito Lagoon and the Pacific Ocean. McGonigle and Deer Canyons drain the southern portion of the subarea and drain southwest into Carmel Valley, Los Peñasquitos Lagoon, and the Pacific Ocean.

The San Dieguito HU includes about 350 square miles between La Jolla on the coast and just east of Santa Ysabel. Drainage is provided by three major creeks and associated tributaries, including the San Dieguito River, Santa Ysabel Creek, and Santa Maria Creek. Average annual precipitation in the San Dieguito HU ranges from approximately 11 inches along the coast to 30 inches near Santa Ysabel (Regional Water Quality Control Board [RWQCB] 1994).

The Peñasquitos HU includes about 170 square miles of land between Poway on the east and La Jolla on the west. There are no major streams in this unit, although it is drained by numerous creeks and intermittent tributaries (RWQCB 1975:II-11-15). Two of these creeks are Los Peñasquitos Creek, located about one mile south of the project site, and Carmel Creek, within McGonigle Canyon in the southern portion of the project site. Los Peñasquitos Lagoon is located about three-quarters of a mile to the west.

As shown on Figure 4D-2, each of the four canyons mentioned above has been identified by the Federal Emergency Management Agency (FEMA) as comprising floodplains subject to a 100-year flood (a flood which has a one percent probability of occurring in any given year). Pacific Highlands Ranch is in Special Flood Hazard Zone A, which is categorized by FEMA as an unstudied zone. The City has records of severe flooding within the San Dieguito River drainage basin at the confluence of Gonzales Canyon and Lusardi Creek. These records show that a storm in 1916 caused severe flooding, with a runoff rate of 72,100 cubic feet per second (cfs). The McGonigle Creek and Deer Canyon floodplains, with a drainage basin of 15.3 square miles, do not have any City record of flooding.

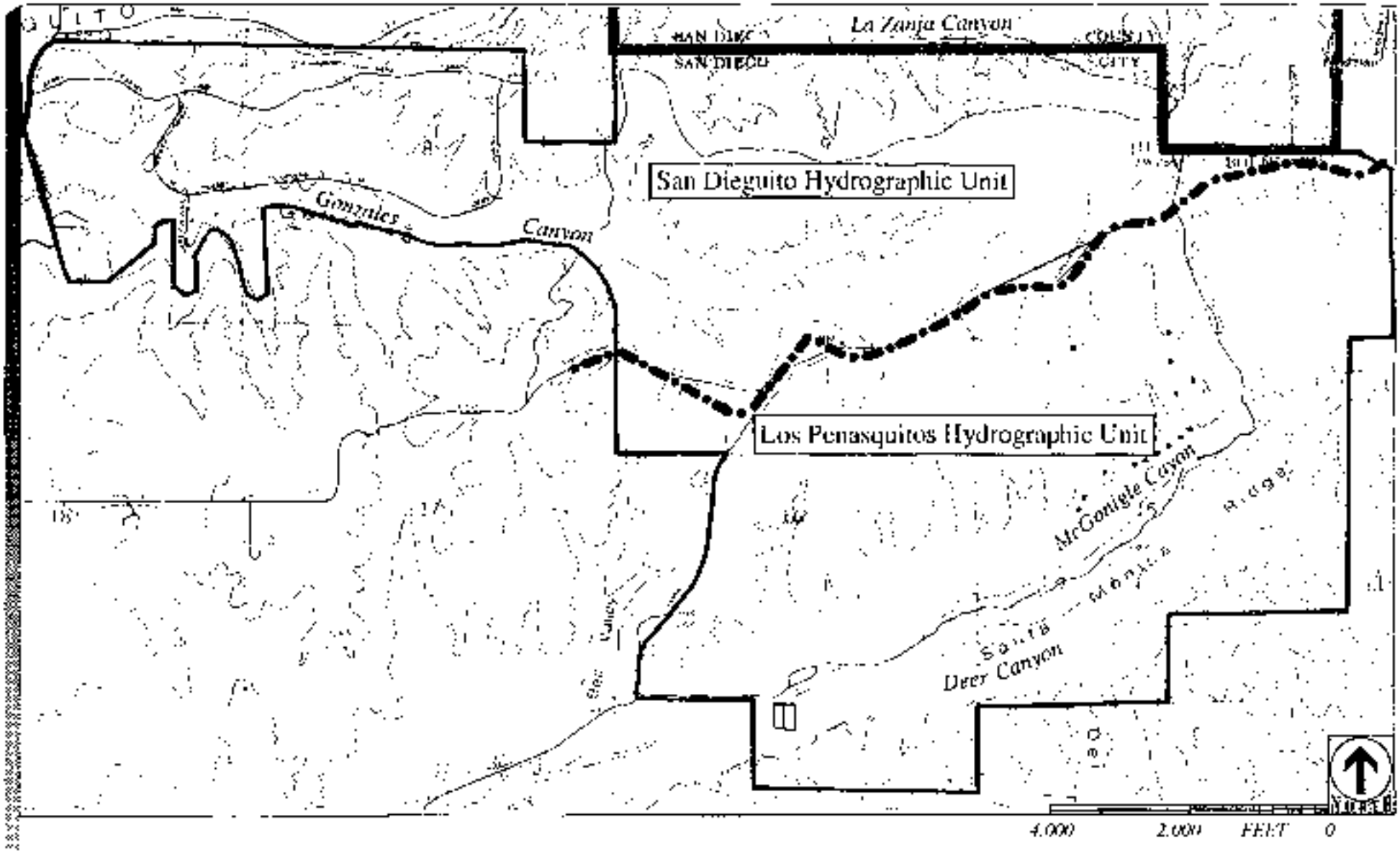


FIGURE 4D-1

Subarea III Watersheds

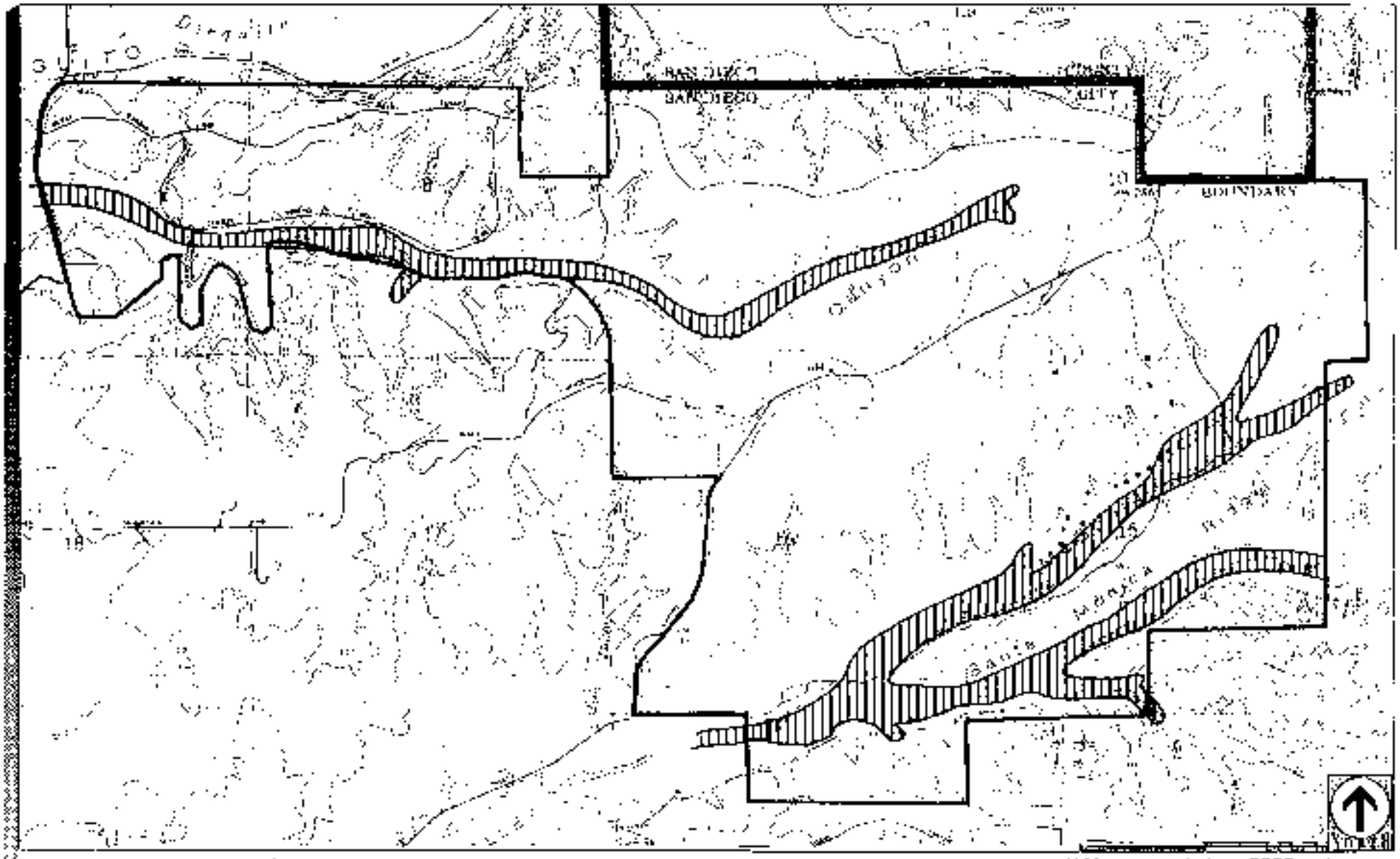


FIGURE 4D-2

Existing Floodplain

There are also several smaller, unnamed creeks and tributaries within and surrounding the subarea and included within the subarea's four watersheds. These smaller drainages are not considered a flood threat at this time.

Flooding Hazards

City Council Policy 600-14 establishes provisions for development within areas of special flood hazard. This policy prohibits development within areas of special flood hazard prior to completion of flood control works (detention basins) with a capacity to contain the 100-year peak flow, the application of appropriate floodplain regulatory zoning, or demonstration that a proposed development or structure complies with the policy's provisions for flood hazard reduction. The policy establishes requirements for development approvals in floodplains, special standards of construction, and standards for utilities and subdivisions.

The City requires that all new construction or substantial improvements within the floodplain fringe zone (which lies between the floodway, or stream channel, and the outer limit of the 100-year floodplain) shall be elevated one foot above the 100-year flood elevation, or otherwise protected (pursuant to City guidelines).

The City's Progress Guide and General Plan (1989) recommends placing an emphasis on the multipurpose use of floodplains. The City has adopted the "California Storm Water Best Management Practices Handbook" (State of California 1993), which is used during development of urban storm water management plans. These best management practices (BMPs) describe several methods of reducing adverse effects caused by urban storm water runoff. Several of the BMPs identified by the City and the State are included in this document as mitigation measures for potential hydrology/water quality impacts.

b) Groundwater

Groundwater basins in the northern portion of the subarea are associated primarily with surface drainage courses in Gonzales Canyon and the San Dieguito River. Groundwater in these areas occurs largely in relatively shallow alluvial deposits, with aquifers in most areas near the project site within 25 feet of the surface (Luke-Dudek 1988; U.S. Geological Survey [USGS] 1983). Well yields in these shallow aquifers are variable, with historical average rates of approximately 250 gallons per minute (gpm) and maximum rates of 1,800 gpm (USGS 1983; California Department of Water Resources [DWR] 1975). A number of deeper groundwater basins are also present in the project site vicinity, in association with geologic strata including Tertiary sediments and Jurassic/Cretaceous metavolcanics. Groundwater associated with these deposits may occur at depths of approximately 300 to over 1,000 feet below the surface. While local production data are not known to be available for these deeper aquifers, well yields are estimated to range between approximately 2 and 125 gpm (USGS 1983). Perched

groundwater may also occur seasonally in the project site and vicinity, in association with impermeable strata and high precipitation rates. Such aquifers are generally not laterally or vertically extensive and typically are not utilized as a water source.

c) Surface Water Quality

Surface water in the subarea and vicinity consists largely of intermittent storm runoff and irrigation drainage. These types of flow are subject to wide variations in water quality with factors such as runoff volume, velocities, and adjacent land use. Runoff within the project vicinity is derived from a number of agricultural, urban, and open space land uses. These types of areas can differ markedly in runoff quality, with undeveloped areas typically contributing lower quantities of contaminants such as bacteria, pesticides, nutrients, solids, and metals than urban or agricultural zones (Wigington, Randall, and Grizzard 1983). Existing and potential beneficial uses identified for surface waters in the project site and vicinity include agricultural, industrial, recreational, water reclamation, and wildlife habitat applications (RWQCB 1994).

San Dieguito River and Lagoon

Runoff from the northern portion of the project site flows primarily into Gonzales Canyon and drains west into the San Dieguito River, which eventually flows west to the San Dieguito Lagoon and the Pacific Ocean. Existing agricultural operations are contributing to soil erosion and sedimentation of natural drainages within and adjacent to the site. In addition, these operations utilize fertilizers and pesticides which are carried by storm water and irrigation runoff into on-site drainages and off-site into the San Dieguito River and Lagoon and Carmel Creek and Los Peñasquitos Lagoon. No reclaimed water is currently being used on-site. Although the current water quality impacts of on-site agriculture may be incremental and less than significant for the project site alone, cumulative urban and agricultural runoff may be significant.

Gonzales Canyon exhibits largely ephemeral runoff associated with storm events, although additional flow is associated with local irrigation runoff. On-site drainage facilities are limited to minor crossing structures (i.e., culverts) and impoundments (as described below under "Flooding Hazards"). Downstream drainage facilities include numerous crossing structures (bridges and culverts) in portions of Gonzales Canyon and the San Dieguito River. The design specifications for these downstream facilities are unknown, although it is likely that at least some of the older structures are not designed to accommodate current 100-year storm flows.

Over the past 10-15 years, development in the Carmel Valley community and other surrounding areas has resulted in sedimentation, urban runoff, and the associated water quality degradation within the San Dieguito River and Lagoon, Los Peñasquitos Lagoon,

and Carmel Valley (Los Peñasquitos Lagoon Foundation 1985; City of San Diego 1992a).

Los Peñasquitos Creek and Lagoon

Runoff from the southern portion of the project site flows primarily into McGonigle and Deer Canyons and drains west into Carmel Valley Creek, which eventually flows west to the Los Peñasquitos Lagoon and the Pacific Ocean. Los Peñasquitos Lagoon has been identified as a valuable and highly sensitive coastal resource (Leedshill-Herkenhoff 1985:2-1). The lagoon is comprised of a tidal channel, salt marsh, mud flats, and salt ponds totaling about 350 acres. These areas provide habitat to a variety of plants, animals, and aquatic life. The size of the lagoon is dependent upon the amount of fresh water draining into the lagoon and the presence of a sand deposit at the lagoon entrance which closes the lagoon most of the year. The sand deposit is caused by a combination of natural and artificial conditions resulting from natural ocean currents and the presence of Highway 101 and the Santa Fe railroad bridge. The entrance can be unblocked by either artificial means or runoff from winter storms with sufficient volume to remove the sand. When the lagoon is blocked, no tidal flushing occurs and the water in the lagoon is not able to assimilate nutrients and urban runoff from storms. This results in periodic algae blooms, accelerated aquatic growth, mosquito breeding, and unsightly conditions.

Regular monitoring of Los Peñasquitos Lagoon has been conducted since 1987 by the Pacific Estuarine Research Laboratory for the Los Peñasquitos Lagoon Foundation. Water quality monitoring has been conducted at three locations for water salinity, dissolved oxygen content, and water clarity. One location is where Carmel Creek flows into the lagoon, the second location is near the railroad trestle, and the third location is near the lagoon mouth. From September 1991 to September 1992, the lagoon mouth was open for 316 days (87 percent of the year), which is twice as long as it was open the previous year. The mouth was open longer presumably due to the "well executed dredging of the mouth during the past 18 months" (Los Peñasquitos Lagoon Foundation 1992:5). When the lagoon mouth is closed, water can stagnate. This can cause oxygen levels to drop, resulting in fish kills. In 1992, there were no fish kills and the lagoon was healthy. More invertebrate species were found in the lagoon in 1992 than in any other year since monitoring began (Los Peñasquitos Lagoon Foundation 1992:5).

Several facilities have been constructed in the lagoon area that act to control sediment, even though they were not built for that purpose; specifically, Interstate 5, Highway 101, the Santa Fe railroad, and three 10-foot-high by 12-foot-wide by 287-foot-long concrete box culverts. The box culverts are intended to drain Carmel Creek but are now filling with sediment and acting as a sediment trap. These facilities have been constructed without any coordinated effort to control sediment or protect the quality of Los Peñasquitos Lagoon. In addition, future development, both approved and proposed, could further affect the hydrologic, hydraulic, and water quality of Carmel Valley and

Los Peñasquitos Lagoon. Some of these areas will be removed or rendered unnecessary due to the Carmel Valley Restoration and Enhancement Program (CVREP) improvements.

The City's Coastal Development Permit ordinance (Section 105.0209) requires that all projects located within the watershed of Los Peñasquitos Lagoon be required to pay an enhancement fee to the Los Penasquitos Lagoon Enhancement Fund. The fee is computed on the basis of site grading at a rate of $0.005 per square foot for all areas graded, with an additional rate of $0.03 per square foot for all impervious surfaces created by the development. The payment of the enhancement fees constitutes adherence to the law; and, as such, is not considered "mitigation."

Two areas of sediment deposition have been identified along Carmel Valley. The first area is adjacent to I-5, with about 28 acres upstream of I-5 and 18 acres downstream of I-5. A second sediment area, about 9.3 acres in size, is located at the confluence of Carmel Creek and the Shaw Valley drainage channel off-site to the north about 1,500 feet within Neighborhood 8. This sediment is trapped by Shaw Valley Road and the remains of a breached dam. All of these sediment-trapping structures are providing a certain level of protection to the lagoon; however, they were not designed for the purpose of sediment control in Carmel Valley and no maintenance for them is provided. Furthermore, the capacity of these structures to continue to trap sediment is limited and a threat of flood damage exists (Leedshill-Herkenhoff 1985).

It should also be noted that plans for the CVREP and enhanced riparian corridor and revegetation of the existing Carmel Creek floodway have been approved by the California Department of Transportation (Caltrans) and construction is under way. CVREP involves the grading and planting of a riparian channel to provide sediment control for the section of Carmel Creek from I-5 to Carmel Country Road. This project when completed will accommodate the 100-year flood flows as well as establish a riparian corridor. As part of the environmental studies for the CVREP project, three water quality samples from Carmel Creek between I-5 and Carmel Country Road were tested (City of San Diego 1990:115). The results of the chemical analyses indicate that lead, zinc, cadmium, and nitrate, as well as other substances, were well below the limits of both drinking water and hazardous waste standards. The measured grease and oil was less than one milligram per liter, which is also considered low (City of San Diego 1990:115).

One of the main project objectives of CVREP is to reduce sediment transport to Los Peñasquitos Lagoon. This will be accomplished by creating a heavily vegetated, natural-appearing channel with an approximate 140- to 200-foot-wide channel bottom, with a total vegetated width of 300 to 400 feet. The channel has been designed to convey 100-year flood flows for the drainage area, which includes the precise plan area. The principal water velocity and sediment control will be achieved by the riparian vegetation. The channel has been designed to convey a maximum peak flow rate of 9,800 cubic feet

per second at I-5. The existing sediment deposition area west of El Camino Real will be retained as an active sediment management area, with sediment removal as required.

In order to provide assurance of erosion and sediment control prior to the establishment of vegetation, a series of four drop structures will be constructed at the narrowest points in the channel, with a maximum height of seven feet. These structures would slow velocities and prevent channel erosion immediately upstream of each structure, prior to the establishment of vegetation. One desilting basin exists near the northeast corner of the precise plan area. It is located south and west of the existing southern segment of Carmel Country Road and is intended to be replaced by the CVREP facilities.

d) Groundwater Quality

The quality of the region's groundwater (use of which is considered minor or insignificant) is described by the City's Water Department as "poor." The poor groundwater quality is probably due to prior agricultural use and/or saltwater intrusion due to overdraft in the region. Shallow groundwater conditions are indicated by standing water in Carmel Valley. It is likely that a permanent shallow groundwater table exists within Gonzales, McGonigle, and Deer Canyons. It is also likely that during the rainy season, shallow perched groundwater conditions could develop within alluvial and colluvial deposits in many areas.

Groundwater that occurs in the coastal portion of the San Dieguito HU is generally sodium chloride in character, with total dissolved solids (TDS) levels typically varying from approximately 1,000 to 5,000 milligrams per liter (mg/l). Groundwater ratings for domestic use in this section of the San Dieguito HU are largely inferior, due to high TDS and sulfate content. Ratings for irrigation use in this unit are also generally inferior due to high electrical conductivity and a high chloride content (RWQCB 1994). Groundwater quality may vary locally, however, with conditions such as site-specific geology and land use. Two existing wells located in Gonzales Canyon just south and west of the subarea, for example, yielded TDS concentrations of 947 and 1,250 mg/l during a 1981-82 study (USGS 1983). Existing and potential beneficial uses identified for groundwater in the project site vicinity include municipal, agricultural, and industrial applications (RWQCB 1994). Local groundwater is currently being used for irrigation in association with on-site agricultural activities.

Groundwater quality in the Peñasquitos HU is generally marginal to inferior for domestic and irrigation purposes. In the coastal part of the Peñasquitos area, groundwater salinities range from 500 to 5,000 mg/l of TDS and usually exhibit a sodium chloride character. The prevailing sodium chloride character of the groundwater found in both the mesas and alluvium-filled valleys can be largely attributed to connate waters. Connate water is the water entrapped in the interstices of a sedimentary rock at the time the rock was deposited.

e) Water Supply

The City's Progress Guide and General Plan states as goals the increased use of local water resources and a decreased reliance on imported water. Innovative water supply techniques emphasizing local resources are encouraged, including reclamation and watershed management. Relevant recommendations include implementation of watershed management practices designed to increase quantity and quality of runoff collection, active participation in water reclamation, publicity regarding voluntary water conservation measures, and encouragement of local agencies to enforce conservation measures. Water quality objectives and criteria of the RWQCB and the State Water Resources Control Board apply to water provided by the City. Water transported through the Second San Diego Aqueduct and anticipated to serve Pacific Highlands Ranch is treated at Lake Skinner, in southern Riverside County, and is expected to meet all applicable standards for drinking water.

The City's Water Utilities Department maintains a list of conditions for new developments designed to ensure adequate water and sewer service to new developments. Measures include provision of a master water study and a master sewer study, installation of fire hydrants at appropriate locations, and design and installation of a reclaimed water distribution system for irrigation of common areas and/or open spaces.

f) Applicable Ordinances and Regulations

Construction of any project in the City of San Diego is subject to the requirements for erosion control in the City's Grading Ordinance and is also required to comply with the federal Clean Water Act. Conformance with the Clean Water Act is established through compliance with the requirements of the State Water Resources Control Board's (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002. For this permit, the SWRCB issued Order No. 92-08-DWQ, "Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activity." To comply with the permit, the applicant for a construction permit must file a complete and accurate Notice of Intent with the SWRCB. Compliance requires conformance with applicable BMPs and development of a Storm Water Pollution Prevention Plan (SWPPP) and monitoring program plan. When construction is completed, the applicant must file a Notice of Termination with the SWRCB.

Runoff flowing across developed sites can pick up contaminants from landscaping, such as pesticides and fertilizers, and areas used by motor vehicles, such as parking lots, driveways, and streets. Pollutants from such areas can include oils, fuel residues, heavy metals (associated with gasoline), fertilizers, and pesticides. For the management of storm water, municipalities in the San Diego region, including the City of San Diego, must comply with the RWQCB's NPDES Permit No. CA 0108758, which consists of wastewater discharge requirements for storm water and urban runoff. In compliance with

Permit No. CA 0108758, a Best Management Practices Program for Stormwater Pollution Control has been created. BMPs appropriate to the characteristics of a project may be employed to reduce pollutants available for transport or to reduce the amount of pollutants in runoff prior to discharge to a surface water body. Among BMPs employed where the increase in impervious surfaces substantially increases runoff rates and volumes are:

- Detention basins, effective for very large drainage areas. These are essentially ponds with controlled release rates to minimize downstream effects. Some pollutants can settle during storage and improve the quality of water released.

- Infiltration basins, designed to hold runoff and allow percolation into the ground. These basins need adequate storage volume and good permeability of the underlying soils.

- Infiltration trenches and dry wells, holes, or trenches filled with aggregate and then covered. Dry wells are typically used for runoff from roofs; infiltration trenches typically serve larger areas, such as streets and parking lots in commercial areas. Both are best suited for areas with permeable soils and a sufficiently low water table or bedrock.

- Porous pavement such as lattice pavers or porous asphalt. These may be used to replace large areas of paving that are not subject to heavy traffic.

- Vegetative controls, plant materials which intercept rainfall and filter pollutants and absorb nutrients.

- Grassed swales, shallow grass-covered channels used in place of a buried storm drain. This type of vegetative control is most applicable to residential areas.

BMPs can also include nonstructural methods, such as controlling litter and waste disposal practices.

Hydrology/Water Quality Issue

1. What modification to the natural drainage system would be required for implementation of the Pacific Highlands Ranch Plan? Would the project result in changes in the rate and amount of runoff?

2. Would the project result in alterations to the course or flow of floodwaters?

3. What effect would implementation of the project have on water quality in the San Dieguito River, Los Peñasquitos Creek, and Carmel Valley River Enhancement Project drainage basins?

1) Issue

What modification to the natural drainage system would be required for implementation of the Pacific Highlands Ranch Plan? Would the project result in changes in the rate and amount of runoff?

Impacts

Impacts to the natural drainage system as a result of development can take the form of increased rate of rainfall runoff, soil erosion, and sedimentation from steep, unprotected areas, runoff pollution, and drainage diversion. Runoff pollution impacts are discussed in detail below under Issue 2.

Subarea Plans 1 and 2. The development of natural areas often causes an increase in the amount of runoff as a direct result of creating impervious surfaces which prevent absorption of water into the ground. Impervious surfaces include paved streets, patios, driveways, and foundations for structures. It is estimated that with implementation of both plans, about 49 percent of the precise plan area would be developed (graded). An increased amount of runoff over the amount normally provided for in natural drainages and water bodies can cause flooding and water damage. Uncontrolled runoff on steep slopes and increased runoff velocity, especially on slopes with exposed soils or sparse vegetation, can cause erosion and increased sediment, which accumulates in streams and lagoons.

Gonzales, McGonigle, and Deer Canyons would be preserved as natural open space in the MSCP open space preserve, thereby minimizing impacts to the natural drainage system. The primary impact to existing drainage courses would be from major road crossings, which is unavoidable due to site topography. The road crossings would incorporate

bridges, culverts, and flow dissipaters to maintain appropriate volumes and prevent flooding.

Development of Pacific Highlands Ranch would cause some increases in discharge volumes into the natural drainages and valleys of the subarea, due primarily to an increase in acreage of buildings, roads, and other hardscape areas. Without protective measures, this hardscape could increase the volume or velocity of storm water runoff, thereby increasing the potential for erosion and flooding. Based on preliminary conceptual studies, postdevelopment runoff from Pacific Highlands Ranch during a 100-year storm event was estimated at 2,782cfs. Of this amount it is estimated that approximately 1,509 cfs will drain to Gonzales Canyon and the San Dieguito River, while 1,273 cfs will drain to Carmel Valley via Deer and McGonigle Canyons. This increase in on-site storm water runoff could result in increased storm water flows downstream from Pacific Highlands Ranch.

Figures 4D-3 and 4D-4 show possible locations for storm water detention basins to handle the anticipated increase in storm water runoff due to implementation of the Pacific Highlands Ranch Plans. Plan 1 and Plan 2 propose two new detention basins in the subarea; the possible locations for these basins are in the southern portion of the subarea near the western entrance of McGonigle Canyon, and in Gonzales Canyon in the northwest portion of the site. While the exact dimensions would depend on more specific tentative map designs, the capacities of the basins would accommodate a 10-year storm with a six-hour duration.

Significance of Impacts

Subarea Plans 1 and 2. Construction activities in Pacific Highlands Ranch could result in significant erosion, siltation, and water quality impacts. The increase in runoff volume and velocity due to the introduction of streets, roads, and other hardscape surfaces could result in significant adverse erosion, water quality, and flooding impacts to existing natural drainage courses and the Carmel Valley storm drain system. However, these impacts are mitigable to below a level of significance by incorporating the City's BMPs and the standard engineering practices listed below.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. Incorporation of the following mitigation measures into project design would mitigate potential hydrology/water quality impacts to a level of less than significant. The exact locations and design of these measures will be determined in conjunction with future specific development proposals. As a condition of future tentative map approvals, the following mitigation measures shall be specified on the grading plan:

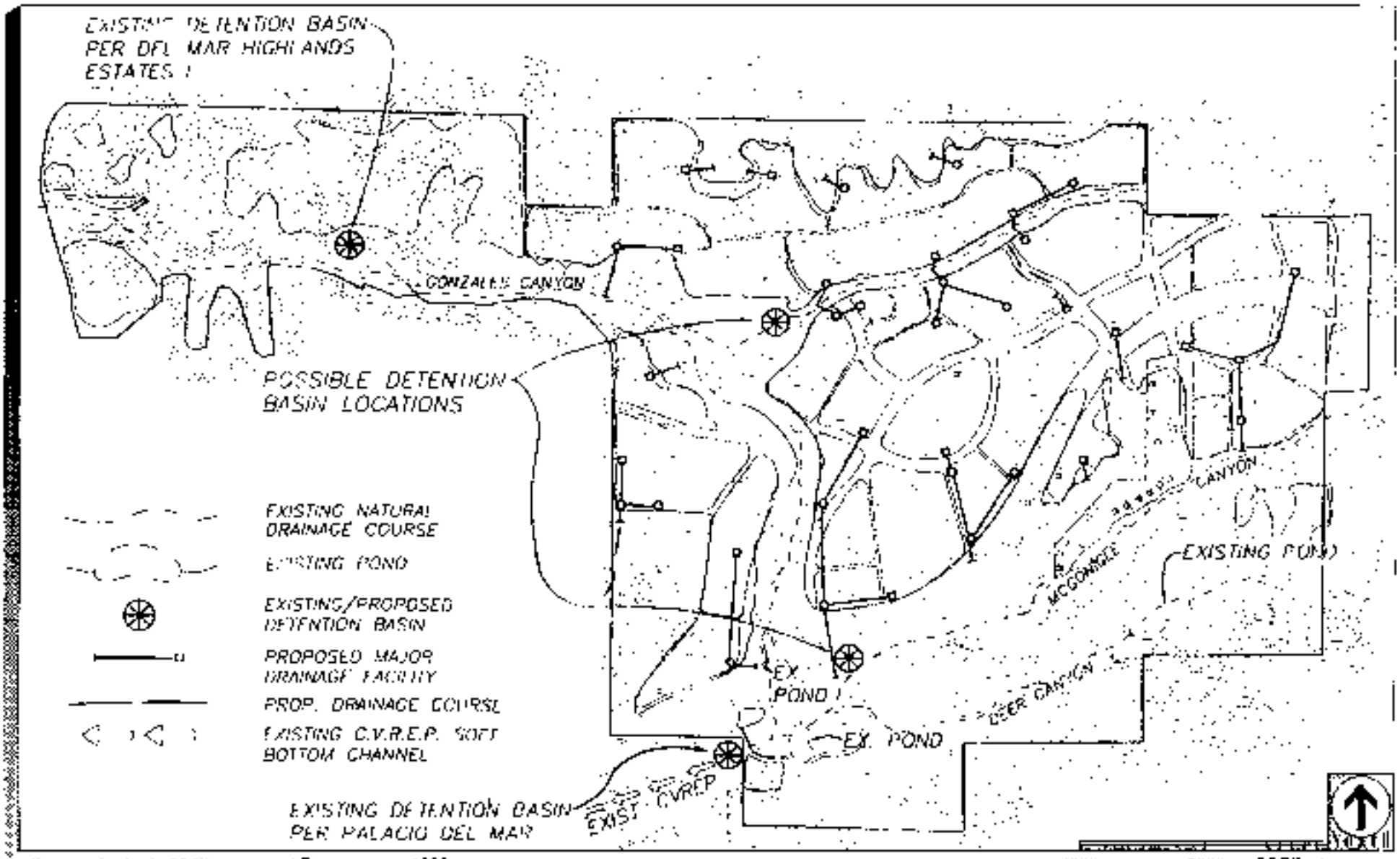
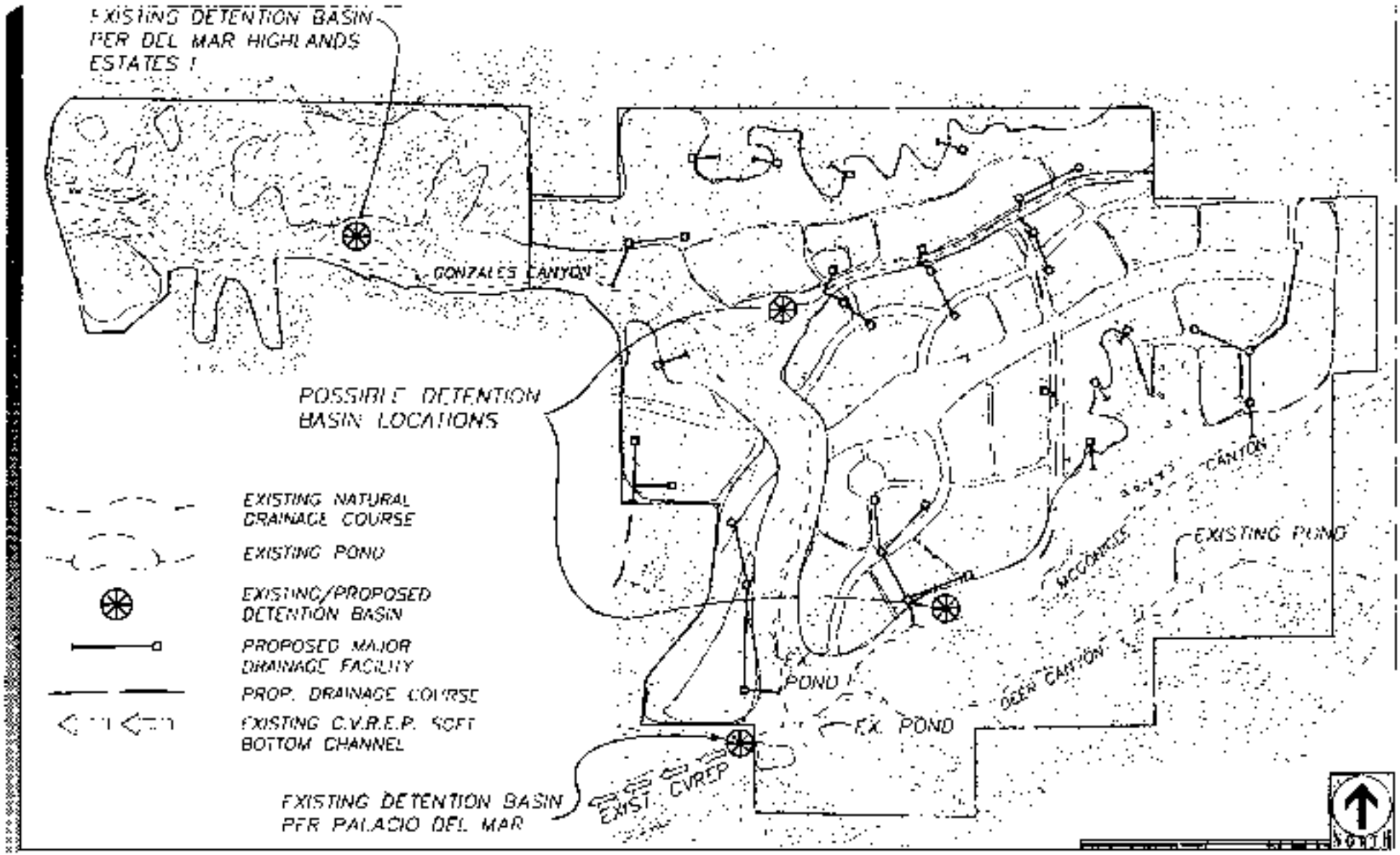


FIGURE 4D-3

Plan 1 - Major Storm Drain Infrastructure



Source: Latitude 33 Planning and Engineering, 1997

FIGURE 4D-4

Plan 2 - Major Storm Drain Infrastructure

Short-term Construction Practices

1. As a condition of future VTMs and to be shown as a note on the grading permit, grading and other surface-disturbing activities either shall be planned to avoid the rainy season (i.e., November through March) to reduce potential erosion impacts or shall employ construction phase erosion control measures, including the short-term use of sandbags, matting, mulch, berms, hay bales, or similar devices along all graded areas to minimize sediment transport. The exact design, location, and schedule of use for such devices shall be determined pursuant to direction and approval by the City Engineer.

2. Prior to the issuance of a grading permit, the grading plan shall locate temporary desilting basins at all discharge points adjacent to drainage courses or where substantial drainage alteration is proposed. The exact design and location of such facilities shall be conducted pursuant to direction by the City Engineer.

3. As condition of future VTMs, the developer shall within 90 days of completion of grading activities, hydroseed landscape graded and common areas with appropriate ground cover vegetation consistent with the biology section mitigation requirements (e.g., use of native or noninvasive plants). These revegetated areas shall be inspected monthly by a qualified biologist until vegetation has been firmly established as determined by the City's grading inspector.

4. Compacted areas shall be scarified, where appropriate, to induce surface water infiltration and revegetation as directed by the project geologist, engineer, and/or biologist.

5. General Construction Activity Storm Water Permits (NPDES No. CAS000002) shall be obtained from the SWRCB prior to project implementation. Such permits are required for specific (or a series of related) construction activities which exceed five acres in size and include provisions to eliminate or reduce off-site discharges through implementation of a SWPPP. Specific SWPPP provisions include requirements for erosion and sediment control, as well as monitoring requirements both during and after construction. Pollution control measures also require the use of best available technology, best conventional pollutant control technology, and/or best management practices to prevent or reduce pollutant discharge (pursuant to SWRCB definitions and direction).

6. A Dewatering Waste Discharge Permit (NPDES No. CA0108804) shall be obtained for the removal and disposal of groundwater (if necessary) encountered during construction. Such permits are intended to ensure compliance with applicable water quality, and beneficial use objectives, and typically entail the use of BMPs to meet these requirements. Discharge under this permit will require compliance with a

number of physical, chemical, and thermal parameters (as applicable), along with pertinent site-specific conditions (pursuant to RWQCB direction).

7. Specified vehicle fueling and maintenance procedures and hazardous materials storage areas shall be designated to preclude the discharge of hazardous materials used during construction (e.g., fuels, lubricants and solvents). Such designations shall include specific measures to preclude spills or contain hazardous materials, including proper handling and disposal techniques and use of temporary impervious liners to prevent soil and water contamination.

Project Design

As conditions of future VTMs and to be included as notes and exhibits on the grading plan, the following mitigation measures would be required:

8. Postconstruction erosion control measures shall be implemented where proposed disturbance is adjacent to or encroaches within existing drainage courses and projected runoff velocities exceed 5 cfs.

9. Final project design shall incorporate all applicable BMPs contained in the City and State *Best Management Practices to be Considered in the Development of Urban Stormwater Management Plan*. Specifically, these may include measures such as the use of detention basins, retention structures, infiltration facilities, permeable pavements, vegetation controls, discharge controls, maintenance (e.g., street sweeping), and erosion controls.

10. Surface drainage shall be designed to collect and discharge runoff into natural stream channels or drainage structures. All project-related drainage structures shall be adequately sized to accommodate a minimum 50-year flood event (or other storm events pursuant to direction from the City).

11. Project operation and maintenance practices shall include a schedule for regular maintenance of all private drainage facilities within common development areas to ensure proper working condition. Public facilities shall be maintained by the City.

12. Surface and subsurface drainage shall be designed to preclude ponding outside of designated areas, as well as flow down slopes or over disturbed areas.

13. Runoff diversion facilities (e.g., inlet pipes and brow ditches) shall be used where appropriate to preclude runoff flow down graded slopes.

14. Energy-dissipating structures (e.g., detention ponds, riprap, or drop structures) shall be used at storm drain outlets, drainage crossings, and/or downstream of all culverts, pipe outlets, and brow ditches to reduce velocity and prevent erosion.

15. Long-term maintenance responsibility of the detention basins may be accepted by the City of San Diego or through other acceptable mechanisms (e.g., homeowners' association or assessment district).

The City Engineer shall verify that the precise plan mitigation measures are conditions for the approval of future proposed VTMs. The measures shall be completed prior to issuance of the Certificate of Occupancy.

2) Issue

Would the project result in alterations to the course or flow of floodwaters?

Impacts

Subarea Plans 1 and 2. The major natural drainage patterns and flood zones within Pacific Highlands Ranch would be preserved as open space, thereby minimizing impacts to the natural drainage system. Proposed development would occur primarily on the upland areas and would not be located in a Floodplain Fringe or Floodway zone. Major flood courses within the subarea would not be significantly altered by the proposed development.

As was discussed previously under Issue 1, increased hardscape associated with development of the subarea has the potential to increase runoff and floodwater flows.

Significance of Impacts

Subarea Plans 1 and 2. Impacts to the course and flow of floodwaters are mitigable to a level of less than significant through the incorporation of the mitigation measures and BMPs identified previously under Issue 1.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. Impacts to floodwaters would be mitigated to a level of less than significant by incorporating the mitigation measures and BMPs identified for Issue 1 above. All flood control measures would be reviewed and approved by the City's Transportation and Drainage Design Division of the Public Works Business Center prior to construction.

3) Issue

What effect would implementation of the plan have on water quality in the San Dieguito River and Los Peñasquitos Creek drainage basins?

Impacts

Subarea Plans 1 and 2. Runoff from Pacific Highlands Ranch drains to the San Dieguito River and Lagoon and to Carmel Valley. Drainage from the subarea does not flow into the Los Peñasquitos Creek, although Pacific Highlands Ranch drainage through Carmel Valley eventually reaches Los Peñasquitos Lagoon.

Potential impacts to water quality which occur in conjunction with urban development include erosion of exposed soils and the resultant sedimentation of natural drainages, as well as runoff of urban pollutants into the natural drainage system. Also, grading and construction activities to implement the Pacific Highlands Ranch Plan would increase the potential for erosion and transport of material both within and downstream of the project site. Specifically, the removal of stabilizing vegetation cover and the creation of artificial slopes have the potential to generate erosion effects. The movement of sedimentary materials into the on-site canyons and off-site into the San Dieguito River and Lagoon and Carmel Valley and Los Peñasquitos Lagoon could produce significant impacts to surface water quality. The influx of such materials would be expected to increase the quantity of total solids, as well as several individual mineral organic and inorganic constituents. A reduction in water quality could have secondary adverse impacts on plant and animal life within these drainages and lagoons.

Accidental spills or leaks of certain construction materials (e.g., vehicle fuels) could adversely impact local surface water quality. In addition, disposal of groundwater extracted during dewatering of construction areas (if necessary) could impact local surface water quality through the presence of contaminants (e.g., suspended sediment added during excavation or pumping) and/or erosion in water discharge areas.

Over the long-term, implementation of the Pacific Highlands Ranch Plan would have the potential to increase the volume and rate of surface water runoff, possibly resulting in increased or continued erosion of soils in the subarea and siltation of natural drainages. There is also a potential for increased or continued reductions in runoff water quality. The increase in impervious surface area and change in landscape to roads, buildings, and domestic landscaping has two effects: (a) to increase the runoff from the site and (b) to reduce the ability of water to percolate into the groundwater reservoir. Irrigation and other sources of imported water also increase the amount of runoff. Uncontrolled runoff in steep slope areas, especially those with exposed soils or sparse vegetation, can cause erosion and increase sedimentation.

Water quality of runoff is likewise altered with urban development. Uncontrolled urban runoff could result in erosion and subsequent sedimentation of downslope or downstream water bodies. In addition, the runoff may be contaminated with pesticides, herbicides, fertilizers, or other "urban" pollutants, such as heavy metals, grease, and oil. Water running off rooftops picks up chemicals from construction materials; water flowing across streets and driveways picks up hydrocarbons and heavy metals associated with roadways and automobiles; and runoff from domestic gardens and agricultural or landscaped areas incrementally contributes fertilizers and pesticides. These pollutants could compromise the quality of downslope or downstream surface water and groundwater, affecting water quality both within Pacific Highlands Ranch and, ultimately, ending up in the San Dieguito River and Lagoon, Carmel Valley, Los Peñasquitos Lagoon, and the Pacific Ocean.

Significance of Impacts

Subarea Plans 1 and 2. The proposed development of Pacific Highlands Ranch has the potential to significantly impact water quality (both directly and cumulatively) in the San Dieguito River and Lagoon, Carmel Valley, and Los Peñasquitos Lagoon. Specifically, such impacts may be associated with short- and long-term erosion and sedimentation and construction-related contaminant discharge. The proposed project's effects would be less adverse overall than those currently resulting from commercial agricultural activities on-site. The runoff of urban-generated pollutants is not considered significant (on a direct basis) due to the presence of existing regulatory controls and the anticipated incremental nature and extent of such pollutants, though the incremental contribution of urban pollutants would be cumulatively significant.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. Direct impacts to water quality would be mitigated to a level of less than significant by incorporating the mitigation measures identified for Issue 1 above. Current plans call for the construction of desilting basins in the subarea (see Figure 4D-3 for alternative desilting basin locations) to reduce erosion and sedimentation during and after development. The exact number, size, design, and location of desiltation/retention basins will be determined in conjunction with future tentative map proposals. Monitoring and maintenance programs for these facilities would be prepared by future developers and after approval by the City, would be incorporated into the CC&Rs for the developments with these facilities in their common areas.

Implementation of the mitigation measures outlined in Issue 1 would not mitigate fully the associated cumulative effects to water quality in the subarea. These impacts would remain significant and unmitigated. Only the No Project alternative would avoid the potential cumulative impacts to water quality.

E. Landform Alteration/Visual Quality

Existing Conditions

a) Site Topography

The irregularly shaped project site consists of approximately 2,652 acres and contains open space, agricultural, nursery, estate residential units, permitted borrow site, and equestrian uses. The property is located south of Fairbanks Ranch, east of development in the Carmel Valley community planning area, and north of the undeveloped open space areas of Subarea V of the NCFUA. A complete discussion of the existing on- and off-site land uses is presented in Chapter 4.A., Land Use. In general, the property is dominated by agricultural fields with rural residential and agricultural maintenance operations which contrast with the smaller areas of native vegetation on the steep slopes and some of the drainages. The 29-unit Rancho Glens Estates residential development and the pet care facility CUP represent the only urbanized uses on the site.

The site topography varies from nearly flat mesas and drainages to steeply sloping hillsides with a substantial vertical elevation differences. On-site elevations range from approximately 40 feet above MSL in the northwestern end of the project area to approximately 428 feet above MSL in the eastern end of the subarea, south of Deer Canyon. Overall, the study area consists of three irregular mesa tops, generally sloping gently both to the north and south from the central mesa and bisected by several major drainages. Figure 4E-1 shows the existing topographic conditions on the project site. This map includes symbols showing the existing single-family residences in the Rancho Glens Estates project.

The site topography is also defined by a series of three prominent east-west drainages and ridgelines. These drainages consist of Gonzales Canyon in the northern portion of the site and McGonigle and Deer Canyons in the south. These tributary canyons drain westerly into either Carmel Valley or the San Dieguito River Valley. Gonzales Canyon empties westward into the San Dieguito Valley and is the primary drainage for the upland mesa areas north of Black Mountain Road. McGonigle Canyon, which is separated from Deer Canyon by Santa Monica Ridge, is the primary drainage for the on-site uplands located south of Black Mountain Road. McGonigle and Deer Canyons meet at the western end of Santa Monica Ridge and act as tributaries to the Carmel Valley drainage, located in the very southwestern portion of the subarea.

Approximately 444 acres (17 percent) of Pacific Highlands Ranch consist of slopes with a 25 percent or greater gradient (Figure 4E-2). These areas are located throughout the study area but are concentrated in the northern and southern portions of the subarea. The most prominent areas of 25 percent slopes are the north-facing slopes above La Zanja

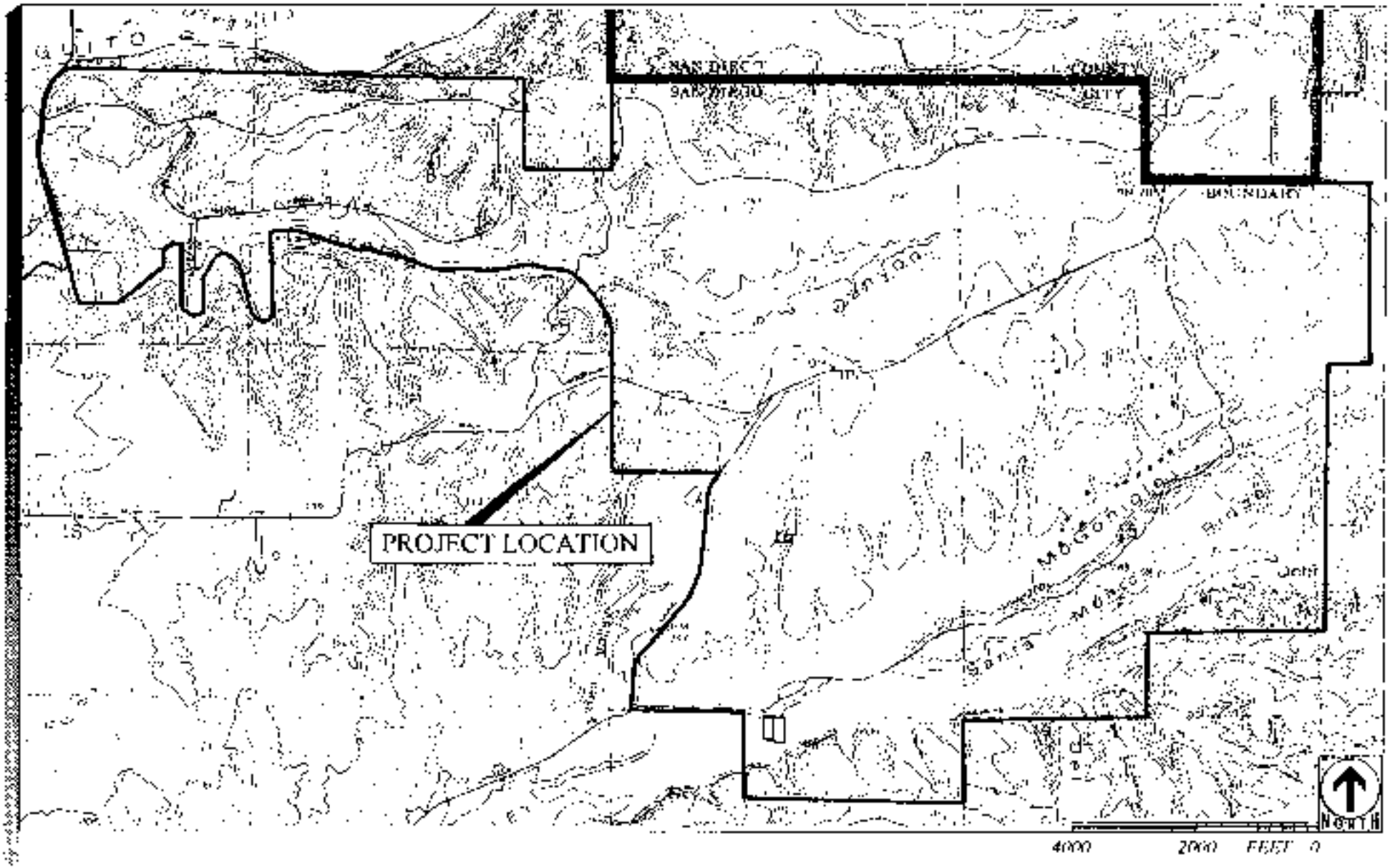


FIGURE 4E-1

Existing Site Topography

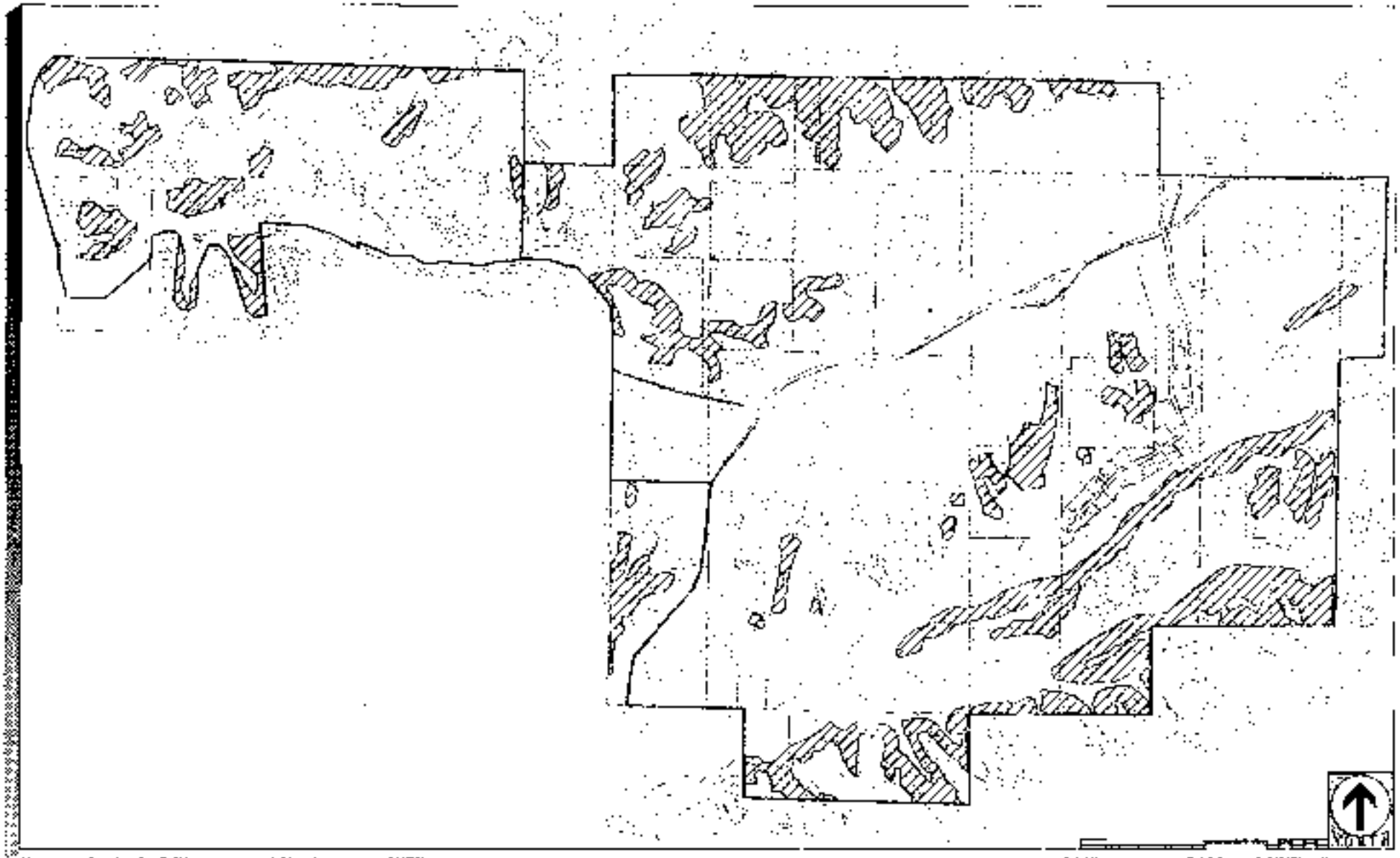


FIGURE 4E-2

Areas of 25% and Greater Slopes

Canyon along the northern boundary and north-facing slopes of both McGonigle and Deer Canyons.

b) Existing Aesthetic Character

The existing aesthetic character of the subarea is primarily rural and agricultural. The commercial agricultural operations and associated scattered residential uses on the more expansive mesa tops and gentler slopes dominate the landscape. However, the site's southern canyons (Deer Canyon, McGonigle Canyon, and the small on-site portion of Carmel Valley) provide a more isolated and undisturbed component to the overall aesthetic character. These canyons and associated steep north-facing slopes are the most significant visual features on the property. Photographs depicting the existing site conditions are discussed below and the photograph locations are shown Figure 4E-3.

Taken from the western central portion of the subarea, Photograph 4E-1 provides a representative view of the northern portion of the subarea, from the upper northwestern corner of the site to the northeastern corner. This figure shows rolling terrain and drainage systems that are dominant throughout the subarea and includes views off-site to the north in Fairbanks Ranch. The agricultural uses of this area are mainly pole-tomato cultivation, the dominant agriculture grown in the area (Photograph 4E-2).

Photograph 4E-3 is taken from the northwestern portion of the subarea looking west and shows the mesa tops and several drainages trending southwesterly toward Carmel Valley. Also, taken from the western boundary of the subarea, Photograph 4E-4 includes a northeasterly panoramic view of agricultural lands, including the upper reaches of Gonzales Canyon.

Photograph 4E-5, taken from the western central portion of the site, is a southerly view down the MSCP drainage which would provide the linkage between Carmel Valley and Gonzales Canyon. In addition to this drainage, the photo reveals the dominant feature in the southern portion of the subarea, the north-facing slopes of the Santa Monica Ridge.

Black Mountain Road traverses the study area roughly west to east in the central portion of Pacific Highlands Ranch. Photographs 4E-6 and 4E-7 are a panoramic view taken in the mid-central portion of the site looking east to south across the site. These photographs illustrate the agricultural uses of Pacific Highlands Ranch. This on-site view also includes a nursery just south of Black Mountain Road, the north-south drainage that runs into McGonigle Canyon, Santa Monica Ridge, and an agricultural area on the western boundary of Pacific Highlands Ranch. The Carmel Valley community can be seen bordering the southwest portion of the subarea.

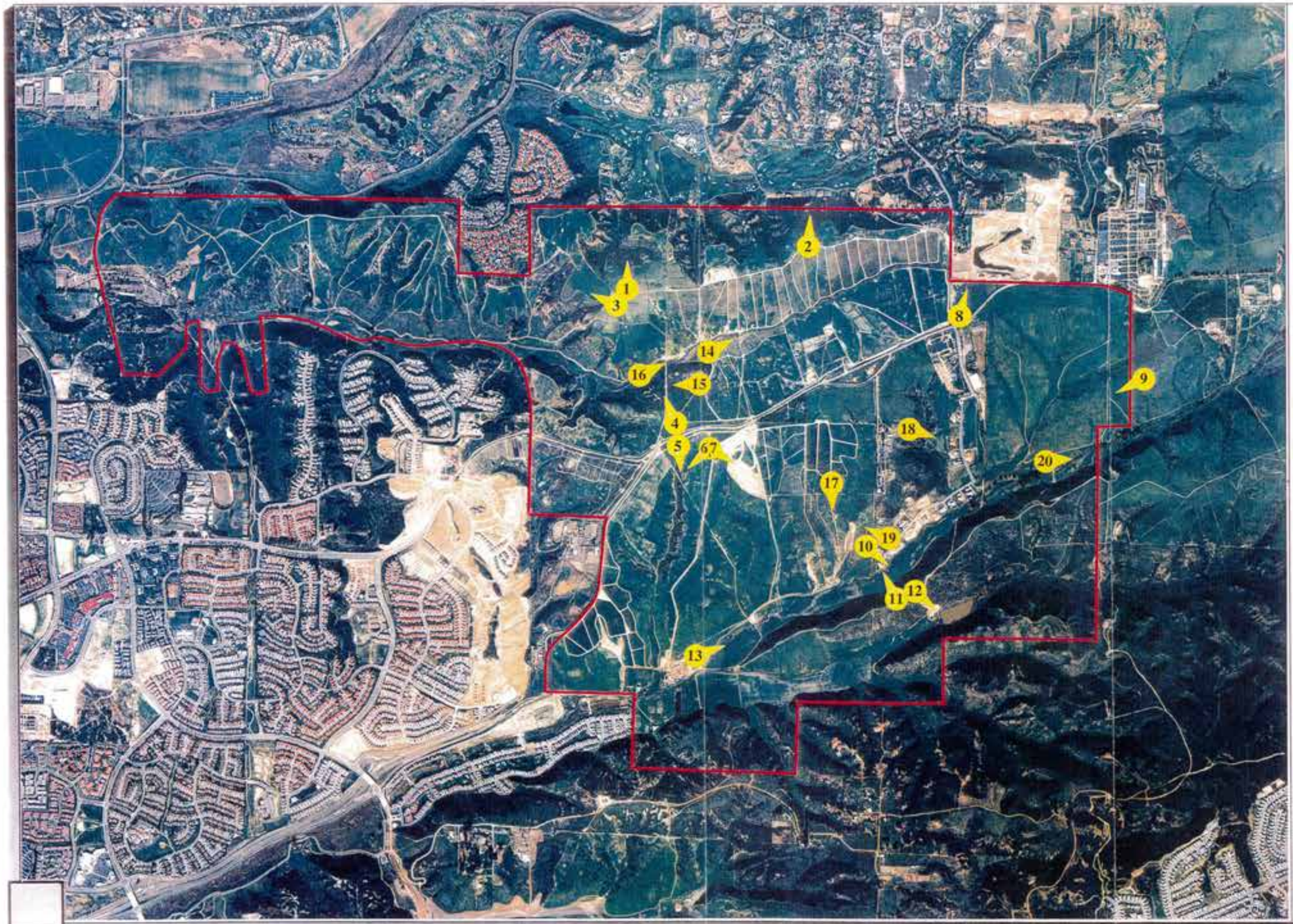
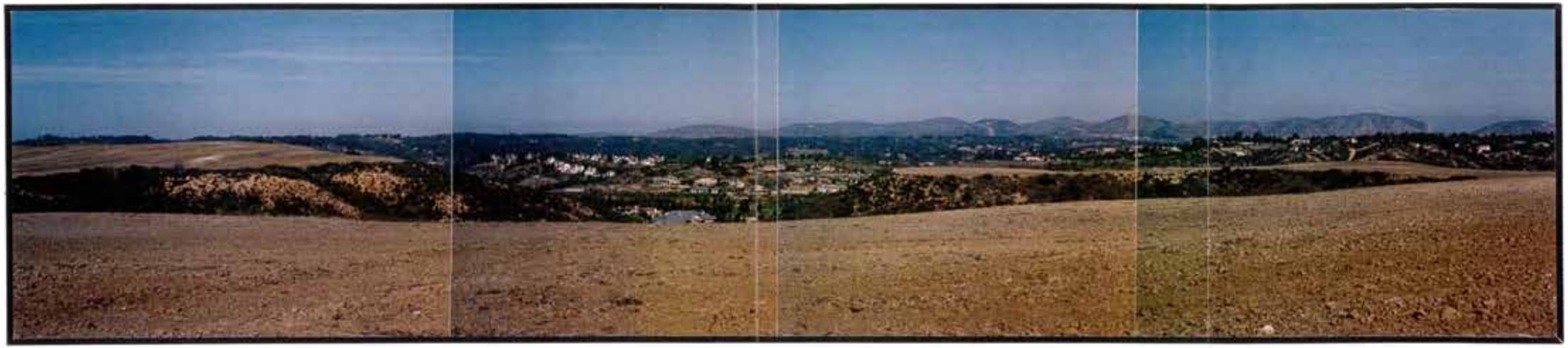


FIGURE 4E-3

Photograph Location Map



PHOTOGRAPH 4E-1
Northerly View from North Boundary of Project

PHOTOGRAPH 4E-2
Northerly View Toward Del Mar Country Club

PHOTOGRAPH 4E-3
Westerly View from Near Western Boundary

PHOTOGRAPH 4E-4
Panoramic View to the East from the Central Portion of the Site

PHOTOGRAPH 4E-5

Southerly View toward McGonigle Canyon

PHOTOGRAPH 4E-6
Panoramic View from Black Mountain Road
Looking East to South

PHOTOGRAPH 4E-7
Panoramic View from Black Mountain Road
Looking South to West

Photograph 4E-8, taken from the northeastern portion of the area looking north, shows the intersection of Black Mountain Road and Caminito Mendiola with The Lakes subdivision in the county of San Diego.

A westerly view of the subarea down Carmel Valley, taken from the eastern boundary, is provided in Photograph 4E-9. The north-south SDG&E easement is a dominant feature in this photo, as is Santa Monica Ridge and McGonigle Canyon to the south and the nursery operations.

Photograph 4E-10 is a southeasterly view of the southern portion of the Rancho Glens Estates project within the context of the steep north-facing slopes of Santa Monica Ridge to the south. This ridgeline is part of the MSCP open space preserve.

Taken from atop Santa Monica Ridge, Photograph 4E-11 illustrates a northwesterly view from the southern portion of the subarea. Apparent from this view are the mesa tops prevalent throughout the central portion of the subarea, the south-trending drainages, and the Ranch Glens Estates project along Caminito Mendiola. Photograph 4E-12, taken from the same location, looks southeast from Santa Monica Ridge down into Deer Canyon. This photo also shows the naturally vegetated hillsides prevalent in the southern portion of the subarea and the Deer Canyon pond.

Photograph 4E-13 looks east from the western entrance into McGonigle Canyon north of Santa Monica Ridge and Deer Canyon south of the ridge.

Photograph 4E-14 provides an easterly view toward the upper reaches of Gonzales Canyon, and across the mesa tops from the western central portion of the project site. Photograph 4E-15 taken from approximately the same location, looks west towards the Gonzales Canyon wildlife corridor and also shows a portion of the planned north-south wildlife corridor. The existing Carmel Valley community is a component of the background view. Photograph 4E-16 taken from the bottom of Gonzales Canyon, nearer the project's western boundary, provides a easterly view through the canyon in the vicinity of a planned trail leading easterly toward the upper reaches of Gonzales Canyon.

Taken from the center of the subarea, Photograph 4E-17 looks south towards the north-facing slopes of Santa Monica Ridge in the MHPA and the existing Ranch Glens Estates subdivision. Foreground views in this photograph would encompass the alignment for SR-56. As seen in this photograph, the dominant features in the southern portion of the subarea are the Santa Monica Ridge, which crosses the entire subarea, and the rolling mesa tops.

Photograph 4E-18 taken from atop a mesa in the eastern central portion of the subarea, shows the naturally vegetated drainage systems that trend north-south in the subarea. An existing Ranch Glens Estates residence is shown in the center of the photograph, as well

PHOTOGRAPH 4E-8
Northeast View from Eastern Boundary of Project

PHOTOGRAPH 4E-9
View Looking West from Eastern Project Boundary

PHOTOGRAPH 4E-10
Southerly View toward Santa Monica Ridge

PHOTOGRAPH 4E-11
Looking Northwest from Santa Monica Ridge

PHOTOGRAPH 4E-12
Southerly View toward Deer Canyon

PHOTOGRAPH 4E-13
Easterly View toward Santa Monica Ridge

PHOTOGRAPH 4E-14
Looking East from Planned Overlook to Urban Amenity

PHOTOGRAPH 4E-15
Looking West at Wildlife Corridor from Planned Del Mar Heights Road

PHOTOGRAPH 4E-16
Looking East along Gonzales Canyon/Urban Amenity

PHOTOGRAPH 4E-17
Looking South from Planned Overlook to Santa Monica Ridge

PHOTOGRAPH 4E-18
Looking Southeast toward Plan 2 Freeway Alignment

PHOTOGRAPH 4E-19
Looking Northwest from Rancho Glens Estates

PHOTOGRAPH 4E-20

Looking East from Planned Trail in McGonigle Canyon

as other residences in the southern portion of the proposed project site. Photograph 4E-19 provides a northerly view of the subarea from the Rancho Glens Estates in the southern portion of the project site. This photograph shows the sloping mesas and ridgelines west of this subdivision.

Taken near the eastern boundary of the subarea just north of McGonigle Canyon, Photograph 4E-20 provides an easterly view along this drainage corridor in the vicinity of a planned trail.

c) Views of the Project Site

Views into Pacific Highlands Ranch from off-site public locations include distant and limited views from Interstate 5 and the San Dieguito River Park. However, these views consist primarily of only the approved Del Mar Highlands Estates project portion of the subarea. Views from undeveloped lands and nearby residential developments of the subarea from the west (Carmel Valley community planning area), south, and east are extensive and the prevailing impression is of rural uses and open space. Views into the subarea from the north are primarily interrupted by the ridge rising south of the San Dieguito River. However, open views exist into the site from the estate residential area (i.e., Sentera development) along the northwestern boundary. Travelers easterly along Del Mar Heights Road have vistas into the subarea, and there are also limited views easterly into the site from the current terminus of SR-56.

d) Mature Tree Stands

Areas of southern sycamore riparian woodland with mature sycamore trees are located in McGonigle and Deer Canyons (see Photograph 4E-13) and eucalyptus groves exist around the nursery south of Black Mountain Road.

Landform Alteration/Visual Quality Issues

1. Would implementation of the plan result in substantial alteration of the existing character of the area?
2. Would implementation of the plan result in a substantial change in topography or ground surface relief features?
3. Would implementation of the plan result in the loss, covering, or modification of any unique geologic or physical features, such as canyons, bluffs, or hillside with a slope gradient in excess of 25 percent?
4. Would implementation of the plan result in the loss of any distinctive or landmark tree(s) or a stand of mature trees?

1) Issue

Would implementation of the plan result in substantial alteration of the existing aesthetic character of the area?

Impacts

Subarea Plan 1 and Plan 2. Regardless of the proposed subarea plan and SR-56 alignment, the conversion of primarily rural agricultural lands with few access roads to the proposed urban uses under both plans would substantially alter the existing aesthetic character associated with the property. The development of between 4,974 new residential units and related land uses shown in Figures 3-1 and 3-2 combined with the construction of SR-56 through the subarea would significantly modify the character of the site and affect the visual appearance from on- and off-site areas.

On-site Views

On-site, views from the Rancho Glens Estates development would be substantially altered and will be changed from open views of rural agricultural lands to partial views west of residential uses and SR-56 and easterly views of elementary school/park uses. Southerly views toward McGonigle Canyon would not be affected under either plan. The alignment of SR-56 under Plan 1 would be within approximately 500 feet of the westernmost Rancho Glens Estates dwelling unit, but several of the residences would be below the proposed grade of the freeway. This grade separation combined with the small ridgeline west of these units limits expansive westerly views into the interior of

development area for several of the existing homes in Rancho Glens Estates (see Photograph 4E-19).

The proposed Overlook Park will provide future residents elevated views of the subarea from selected vantage points (see Figures 3-6 and 3-8). These Overlook Parks are planned to provide access to the extensive trail system, and offer views of the natural open space system and wildlife corridors. As shown in Photographs 4E-14 and 4E-15, the proposed Overlook Park in the western portion of the subarea would provide views of the western MHPA and Gonzales Canyon, and also access to multi-use trail system. An Overlook Park proposed in the eastern portion of Pacific Highlands Ranch, is also integrated into the multi-use trail system, and would provide southerly views of the undisturbed portion of the subarea. This location would offer future residents views of the MHPA, McGonigle Canyon, and Santa Monica Ridge, as shown in Photograph 4E-9.

Views from the proposed SR-56 under either SR-56 alignment (see Photographs 4E-7, 4E-13, and 4E-19 for representative freeway locations) would generally allow motorists views of the proposed residential development to the north and the natural open space system to the south. Aesthetic impacts associated with SR-56 would also include any noise walls greater than six feet in height adjacent to the freeway and other noise attenuating measures such as berms. These impacts are also described in the SR-56 EIR (City of San Diego 1998).

Off-site Views

Off-site views from the north from public parks and viewing areas into the subarea do not exist. The ridgeline which generally forms the northern boundary of the subarea screens public views into the central portion of the site from areas within the San Dieguito River Valley or La Zanja Canyon. However, views into the site from surrounding residential areas would occur. For example, the estate residential and moderately low residential areas on-site would be visible from the Senterra residential development at the northwestern boundary of the site. Likewise, open expansive views of much of the central portion of the developed site would occur from the existing residential areas, Torrey Heights park, and existing Del Mar Heights Road along the western boundary within Carmel Valley and from The Lakes project at the northeastern corner of the site in the County of San Diego. Off-site to the south, much of the developed project site (e.g., SR-56 and the Town Center Village) would also be visible northerly from Shaw Ridge Road within Subarea V. Along with the long-term aesthetic impacts associated with the developed site, there would also be interim visual impacts from off-site areas during the phased construction of the project.

Significance of Impacts

Subarea Plan 1 and Plan 2. The substantial change in aesthetic character described above would occur under both land use scenarios. This change represents a significant direct and cumulative impact from on- and off-site locations. The development of the project site would incrementally contribute to the change the aesthetic character of the subregion in conjunction with the existing and planned development in Carmel Valley and Subareas IV and V.

Mitigation, Monitoring, and Reporting

Subarea Plan 1 and Plan 2. The preservation of MSCP and urban amenity open space along with implementation of the landscaping concept as future tentative subdivision maps are processed within Pacific Highlands Ranch would reduce the identified aesthetic impacts. These measures would not reduce the impacts to below a level of significance. Avoidance of the impact would be accomplished by the No Project alternative.

Specific mitigation measures would be required at the future tentative map stage; specifically, prior to issuance of a grading permit, the Development Services Development Coordinator shall review the grading and landscape plans for consistency with the subarea plan guidelines. Upon completion of the grading for any future tentative map within Pacific Highlands Ranch, and associated off-site conditions, the developer shall submit a letter to Development Services from a qualified consultant certifying that all landscaping for the major manufactured slopes (e.g., roadway slopes) has been implemented. Monitoring shall be required to assure the long-term establishment of the landscaping. The maintenance program shall be effective for a three-year period following the installation of the plantings or until such time as all plantings are established. The long-term monitoring shall establish an inspection schedule, establish replanting specifications, and require written notification once a year to Development Services Department Development Coordinator by the applicant-hired consultant to verify the status of the revegetation.

If the revegetation effort includes the reestablishment of native habitat within or adjacent to the MHPA, a five-year monitoring program would be required. For erosion control or other revegetation outside the MHPA and not part of any biological mitigation, the revegetation plan must conform with the City's Landscape Technical Manual with a monitoring period of 25 months.

2) Issue

Would implementation of the plan result in a substantial change in topography or ground surface relief features?

Impacts

a) Subarea Plan 1

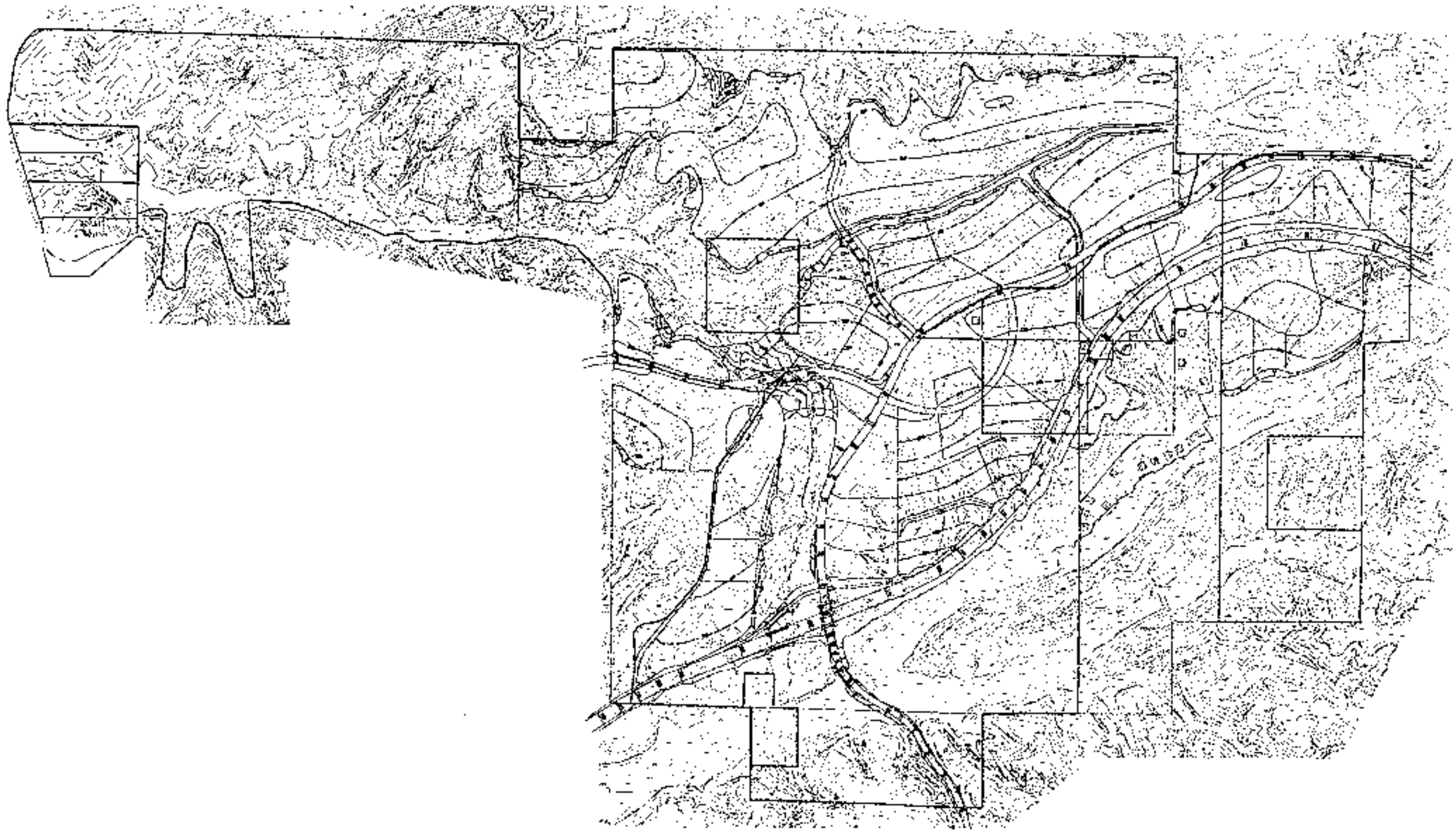
Development of Pacific Highlands Ranch pursuant to Plan 1 would substantially alter the existing landform. The undisturbed character of the site north of McGonigle Canyon would be replaced by the development of approximately 1,100 acres (41 percent) of the project site and require grading on the numerous mesa top areas and tributary drainages. With the exception of the MSCP north-south wildlife corridor and the steep slopes along the northern boundary, the project site north of McGonigle Canyon would be graded to accommodate the proposed land uses. In the southern portion of the site, McGonigle/Deer Canyons and Santa Monica Ridge would be retained as MSCP open space. Figure 4E-4 illustrates the conceptual grading plan proposed under Plan 1 for Pacific Highlands Ranch. The proposed concept grading plan for Plan 1 incorporates the grading plans associated with SR-56 Alignment "F." Grading for the freeway through Pacific Highlands Ranch would disturb approximately 150 acres of the site.

Overall, the total earthwork quantity for the entire subarea under Plan 1 would be approximately 14,000,000 cubic yards of excavation and fill, which would be balanced over the entire site. The amount of earthwork to implement the proposed grading concept would require approximately 11,200 cubic yards per graded acre, and the maximum depth of cut would be approximately 30 feet and the maximum depth of fill would be approximately 50 feet.

Development of the various land uses throughout the project site would require numerous manufactured slopes greater than 30 feet in height, with a maximum height of approximately ~~75~~ 125 feet. Figure 4E-3 shows these slopes under Plan 1.

b) Subarea Plan 2

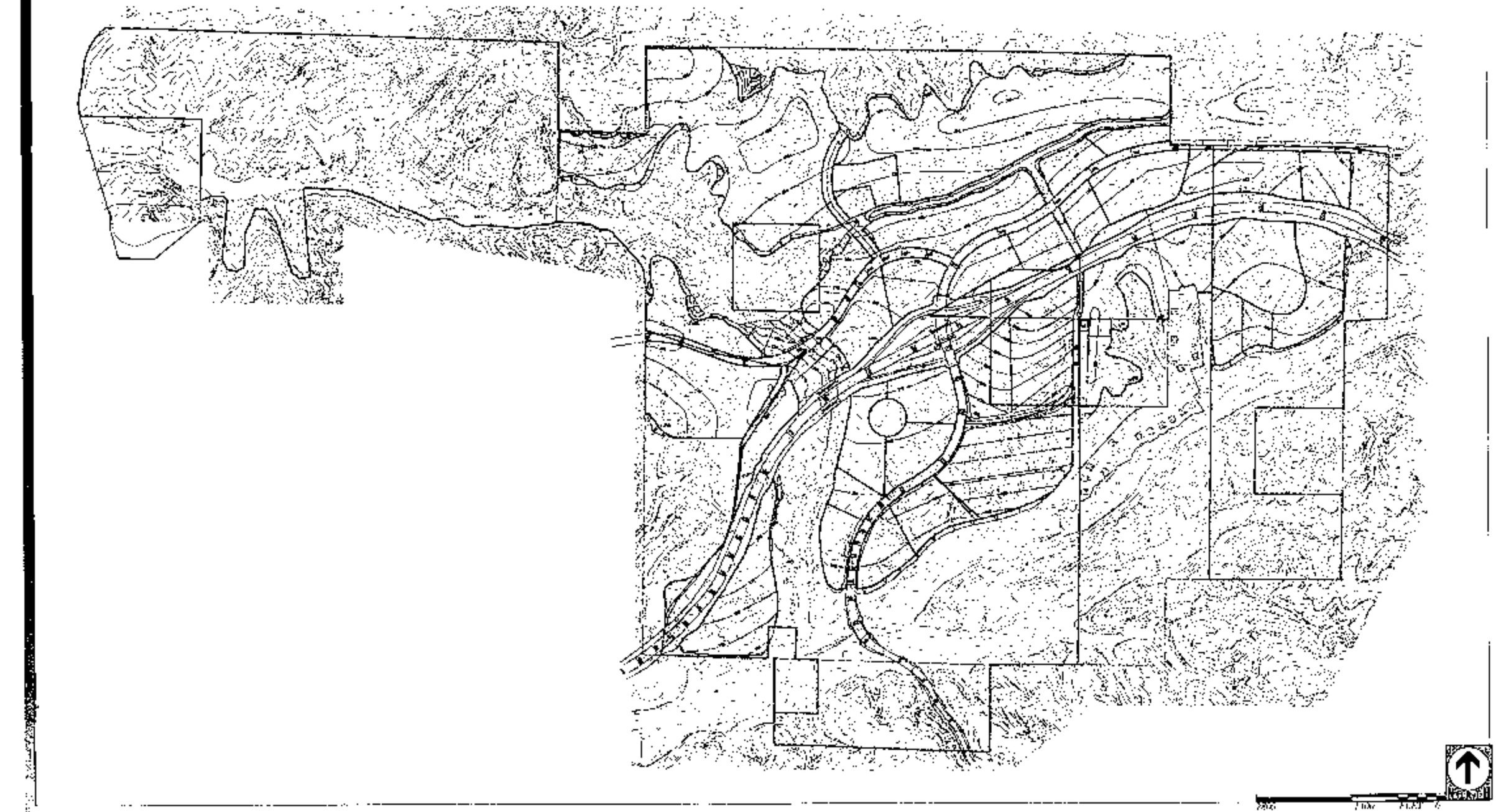
In a similar fashion, development of Pacific Highlands Ranch pursuant to Plan 2 would also substantially alter the existing landform. Figure 4E-5 illustrates the grading concept proposed under Plan 2 for Pacific Highlands Ranch. As with Plan 1 above, the proposed concept grading plan for Plan 2 incorporates the grading plans associated with SR-56. Grading for the freeway through Pacific Highlands Ranch under Plan 2 would disturb approximately 150 acres.



Map Source: LatitudeX 33 Planing and Engineering 1998

FIGURE 4E-4

Grading Concept
Plan 1



Map Source: Lauritzen Planning and Engineering 1998

FIGURE 4E-5

Grading Concept Plan 2

Overall, the total earthwork quantity for the entire subarea under Plan 2 would be nearly identical to the cubic yards of excavation and fill discussed above for Plan 1. Development of the various land uses throughout the project site under Plan 2 would also require numerous manufactured slopes greater than 30 feet in height, with a maximum height of ~~50~~ 125 feet.

c) Carmel Valley Neighborhood 10 Precise Plan

As noted in the Project Description (see Figures 3-5 and 3-6), another component of the proposed MHPA boundary adjustment includes encroachment into previously designated open space within the Neighborhood 10 Precise Plan. As described in the previous EIRs for Neighborhood 10 (City of San Diego 1993 and 1997), landform alteration impacts were identified as significant. Filling of this small tributary canyon within the central portion of Neighborhood 10 (approximately 8.1 acres) to create a pad area for 22-24 additional single-family units would create additional landform alteration impacts.

Significance of Impacts

a) Subarea Plan 1 and Plan 2

Both grading concepts associated with the proposed land use scenarios would require substantial alteration of the topography to develop and access the site. The amount of earthwork anticipated under both Subarea Plans would substantially exceed the City's significance threshold for grading impacts of 2,000 cubic yards per graded acre. The filling of drainages and grading of the broad mesa areas would represent alterations to the existing topography and are considered to be significant direct and cumulative landform alteration impacts.

b) Carmel Valley Neighborhood 10 Precise Plan

The additional area of grading (canyon fill and associated manufactured slope) within Neighborhood 10 would represent a significant landform alteration impact.

Mitigation, Monitoring, and Reporting

a) Subarea Plan 1 and Plan 2

Specific mitigation measures which would be required at the future tentative map stage include that prior to issuance of a grading permit, Development Services shall review the grading plans for consistency with the subarea plan guidelines. These measures include using slope rounding and blending techniques where manufactured slopes meet natural slopes, varying slope gradient and width, and contouring edges to achieve a more natural appearance. Implementation of these measures would reduce the landform alteration

impact, but not to below a level of significance. However, only implementation of the No Project alternative would avoid the landform alteration impact. These adverse effects comprise significant and unmitigable direct and cumulative impacts of the proposed project.

b) Carmel Valley Neighborhood 10 Precise Plan

As described in the previous EIRs for Neighborhood 10 (City of San Diego 1993 and 1997), mitigation for landform alteration impacts include that all manufactured slopes greater than 10 feet in height be contour graded and minimized during the final engineering design. As with the landform alteration impacts associated with the Subarea Plans, these measures would not reduce the impact to below a level of significance. Implementation of the contour grading measures would occur at the time grading permits are approved.

3) Issue

Would implementation of the plan result in the loss, covering, or modification of any unique geologic or physical features, such as canyons, bluffs, or hillside with a slope gradient in excess of 25 percent?

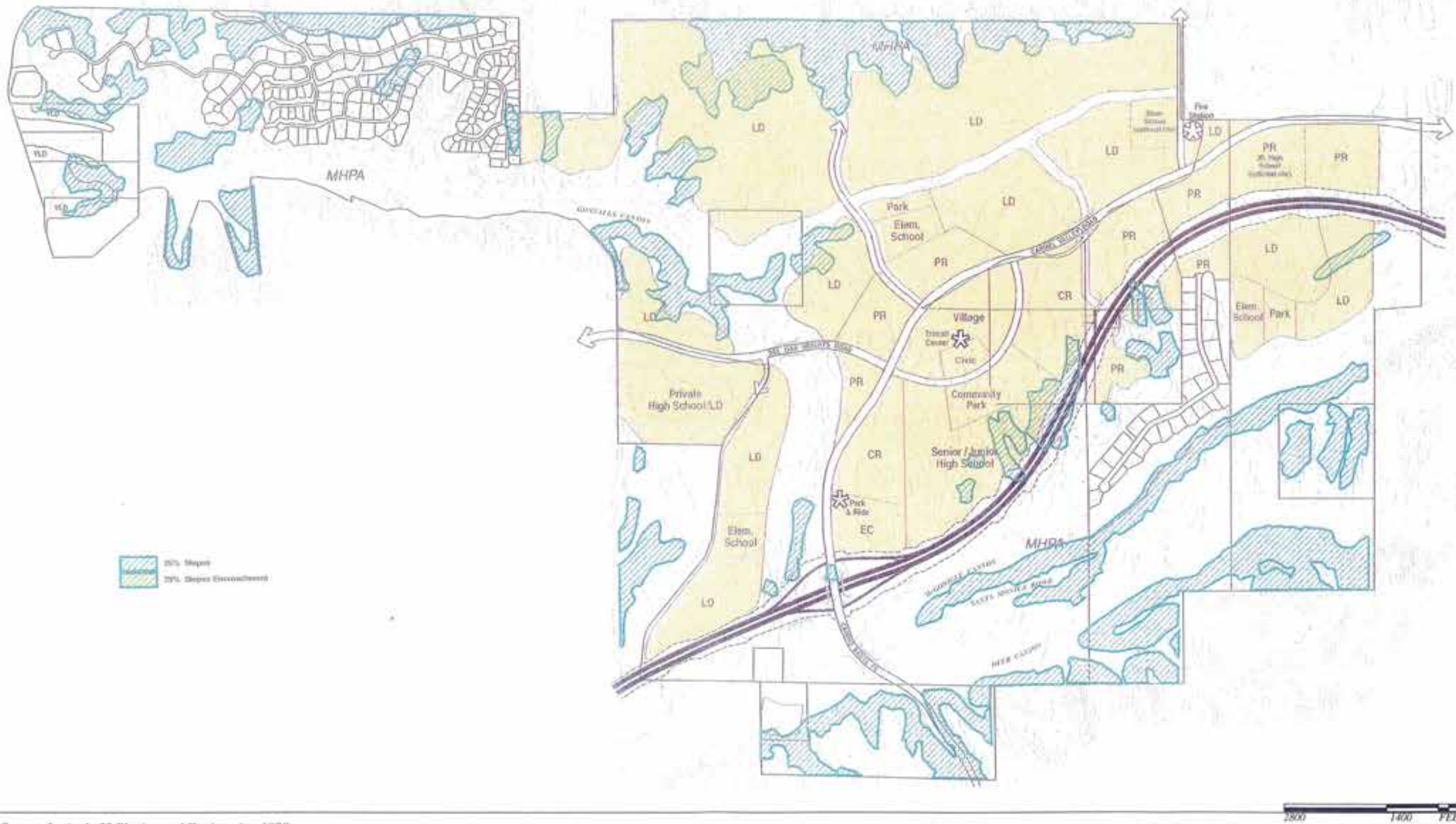
Impacts

a) Subarea Plan 1

The majority of natural slopes with a gradient in excess of 25 percent in Pacific Highlands Ranch would be left as open space under Plan 1. These steep slope areas occur south of the northern subarea boundary in the central portion of the site as well as west of Carmel Valley Road and south of McGonigle Canyon. Based on the slope encroachment analysis prepared for the project, approximately 63.7 acres (17.3 percent) of the 369 acres (excluding previously approved projects) of steep slopes would be disturbed under Plan 1. These encroachment areas consist of small locales in the central and western portion of the project site (Figure 4E-6), and exceed the 7 percent encroachment allowance per City thresholds. Steep slope encroachment associated with the grading necessary for SR-56 is addressed in the EIR for that project.

b) Subarea Plan 2

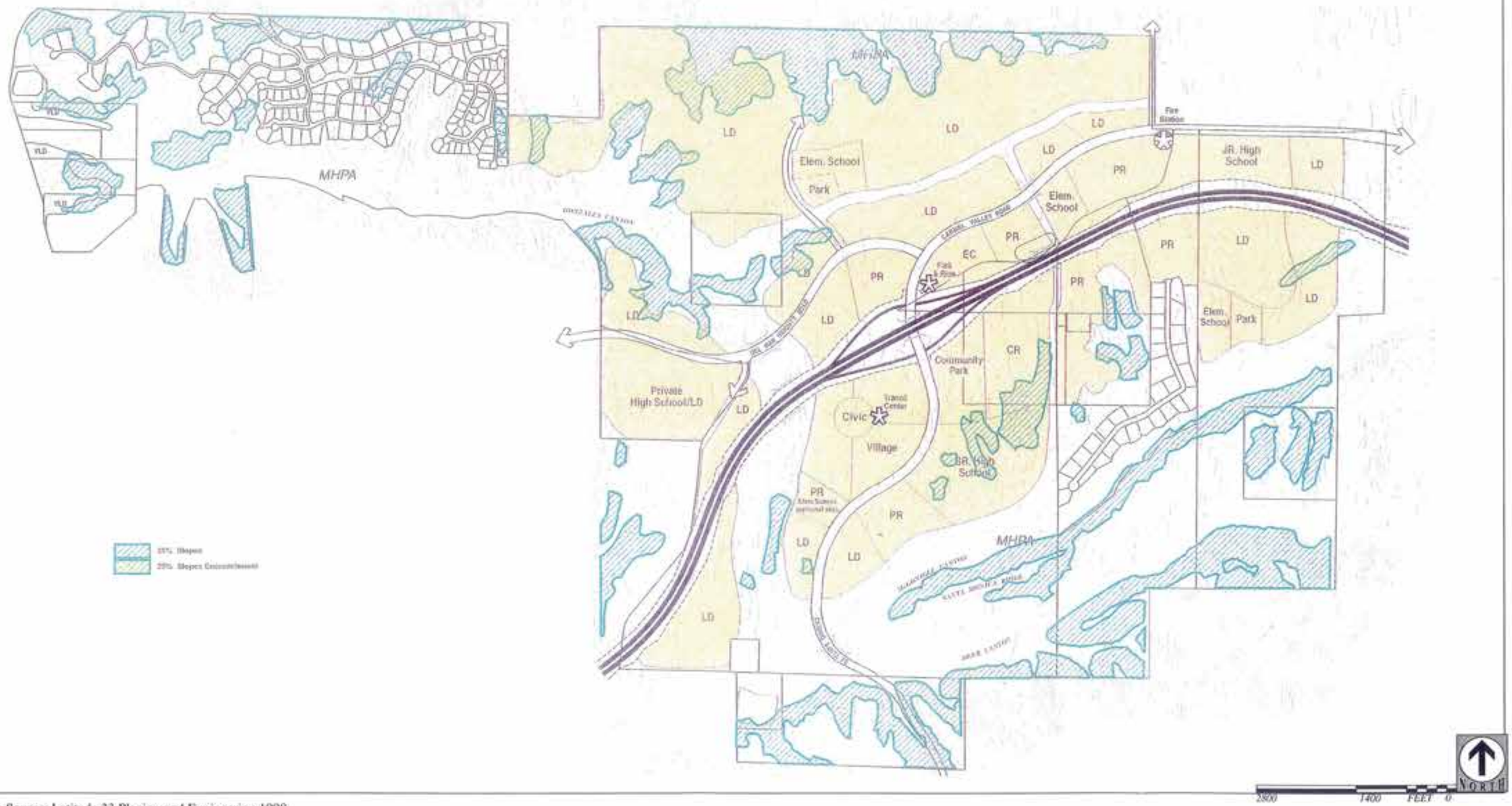
As with Plan 1, the majority of natural slopes with a gradient in excess of 25 percent in Pacific Highlands Ranch would be left as open space under Plan 2. Based on the slope encroachment analysis prepared for the project, approximately 70.4 acres of the 369 acres (19.1 percent) of the steep slopes would be disturbed. These encroachment areas would



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 4E-6

Areas of Encroachment into 25% Slopes Plan 1



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 4E-7

Areas of Encroachment into 25% Slopes Plan 2

also consist of small locales in the central and western portion of the project site (Figure 4E-7) and exceed the 7 percent encroachment allowance per City thresholds.

Significance of Impacts

Subarea Plan 1 and Plan 2. Based on the steep slope encroachment analysis prepared for both subarea plans (see Land Use, Chapter 4.A., Issue 2), significant impacts are anticipated on canyons, bluffs, or hillsides in Pacific Highlands Ranch.

Mitigation, Monitoring, and Reporting

Subarea Plan 1 and Plan 2. Although both subarea plans have been designed to minimize impacts to steep slopes, strict compliance with the encroachment thresholds in the development regulations of RPO would require a project redesign. Both plans' inconsistency with the RPO encroachment provisions can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

4) Issue

Would implementation of the plan result in the loss of any distinctive or landmark tree(s) or a stand of mature trees?

Impacts

Subarea Plan 1 and Plan 2. Mature sycamore stands occur within Deer and McGonigle Canyons. There is also an area of southern willow scrub in the eastern portion of Gonzales Canyon. The mature sycamore stands in western Gonzales Canyon and McGonigle Canyon east of its confluence with Deer Canyon are all located in areas planned to be part of the MSCP preserve design and would not be impacted under either land use plan. The southern willow scrub vegetation in upper reaches of Gonzales Canyon would be retained as natural vegetation within the urban amenity.

Significance of Impacts

Subarea Plan 1 and Plan 2. No significant impacts are anticipated.

Mitigation, Monitoring, and Reporting

Subarea Plan 1 and Plan 2. No mitigation measures would be required.

F. Cultural Resources

This section of the MEIR is based on a previously completed technical report entitled Historical/ Archaeological Survey Report for Pacific Highlands Ranch Future Urbanizing Area, San Diego, California (Gallegos & Associates 1993). That report describes the results of a complete survey of the subject property conducted in 1993. The Gallegos & Associates report is included in this MEIR as Appendix D1. An updated survey report prepared by RECON is included in this MEIR as Appendix D2. References cited in this section can also be found in Appendix D2.

In addition to the work done by Gallegos & Associates, information on nine cultural resource sites, located in the central portion of Pacific Highlands Ranch, was obtained from a series of reports prepared by KEA Environmental for the City of San Diego Engineering and Capital Projects Department and Caltrans, District 11. These reports provide information on the cultural resource significance testing that was completed during analysis of four alternative alignments for State Route 56 between Interstate 5 and Interstate 15. The testing completed by KEA was designed to determine historic property eligibility for nomination to the National Register of Historic Places.

Based on the information provided in these completed technical reports RECON has conducted focused site surveys and significance evaluations at 13 locations within the project area. The fieldwork was designed to expend every effort to relocate previously recorded sites, gather field information and determine the significance of all of the sites within the areas determined to be potentially impacted by the proposed development of Pacific Highlands Ranch. These selected sites represent a portion of the total number of sites recorded in the Pacific Highlands Ranch boundaries. The sites listed on Table 4F-1 are under consideration because they meet the following criteria: (1) they are located within areas that could be impacted from currently proposed conceptual grading for Subarea Plans 1 and 2; and (2) these are sites for which significance testing or data recovery efforts have not been completed. The remainder of the sites in the Pacific Highlands Ranch project area were eliminated from consideration because they have been destroyed, are within areas of designated open space, have previously been subjected to significance evaluation in conjunction with the SR-56 EIRs and found to be not significant, and/or they have been subjected to significance evaluation and found to be "important" resource areas.

Existing Conditions

The cultural resource sites that are identified within Pacific Highlands Ranch represent both historic and prehistoric era human use and settlement. Fifty-two sites are recorded with the South Coastal Information Center (SCIC) within Pacific Highlands Ranch. In addition, there are 11 isolates plotted for this same area. Thirteen of these sites are

TABLE 4F-1
SUMMARY OF SITE STATUS

Site Designation (CA-SDI-)	Status
-7205	Tested by RECON, results provided in this document
-13098	Tested by RECON, results provided in this document
-6697/H	Tested by RECON, results provided in this document
-13092	Tested by RECON, results provided in this document
-6913	Tested by RECON, results provided in this document
-6914	Tested by RECON, results provided in this document
-13093	Tested by RECON, results provided in this document
-14002 (-6916, -6917)	Tested by RECON, results provided in this document
-6701*	Tested by RECON, results provided in this document
-6915*	Tested by RECON, results provided in this document
-6921*	Tested by RECON, results provided in this document
-6920/H*	Tested by RECON, results provided in this document
-6919*	Tested by RECON, results provided in this document
-10138*	Tested by RECON, results provided in this document
-7201*	Tested by RECON, results provided in this document
-7203*	Tested by RECON, results provided in this document
-6911	Not significant (KEA)
-13099	Not significant (KEA)
-10221	Not significant (KEA)
-6918	Not significant (KEA)
-7206	Not significant (KEA)
-6696	Not significant

TABLE 4F-1
SUMMARY OF SITE STATUS
(continued)

Site Designation (CA-SDI-)	Status
-6698	Not significant
-6700	Not significant
-13095	Mapped in open space, index at TM
-13097	Mapped in open space, index at TM
-13091	Mapped in open space, index at TM
-13099	Mapped in open space, index at TM
-7202	Mapped in open space, index at TM
-7204	Mapped in open space, index at TM
-13096	Potentially eligible for nomination to the National Register/possible RPO significance (KEA)
-6912	Potentially eligible for nomination to the National Register/possible RPO significance (KEA)
-14003	Potentially eligible for nomination to the National Register/possible RPO significance (KEA)
-14562	Potentially eligible for nomination to the National Register/possible RPO significance (KEA)
-13101/H	May have state or local significance, mapped in open space
-14001/H	May have state or local significance, mapped in open space

*Sites that were not relocated in 1993 during the survey by Gallegos & Associates.

recorded within the Del Mar Highlands project boundaries and are not dealt with further in this report. An extensive testing and data recovery effort was completed for these sites and presented in The Cultural Resources of San Dieguito Estates (Norwood and Walker 1980). The remaining 39 sites are listed in Table 4F-2 by their status as had been determined by previously completed fieldwork or research. KEA Environmental has been conducting significance evaluations at a number of sites, which fall within a variety of proposed alignment corridors for a portion of SR-56. They have completed evaluation of nine prehistoric sites and two historic-era properties, which are within Pacific Highlands Ranch. These sites lie within the central portion of Pacific Highlands Ranch. Two additional sites were evaluated by Caltrans archaeologists during early stages of the SR-56 planning (Rosen 1989; Dominici 1989).

a) Background - Prehistory

San Diego County was occupied prehistorically by at least two archaeologically distinctive cultural groups. The Early Period is traditionally divided into the San Dieguito and La Jolla complexes. The San Dieguito has been generally accepted as the first sedentary inhabitants of the region, occupying San Diego County as early as 9,000 years ago. The initial occupation (San Dieguito Complex) is believed to represent people who hunted large and small game, fished, milled seeds, and collected and processed plants and various species of shellfish.

Extensive use of milling, and a heavy reliance on coastal resources characterize the La Jolla/Pauma Complex. Archaeological sites reflecting this time period include coastal habitation sites with significant quantities of shell, inland hunting/gathering and foraging camps, and quarry sites. The San Dieguito Complex and the La Jolla/Pauma Complex may represent the same cultural heritage. There is some controversy about the extent to which these differing patterns reflect temporal differences or regionally adaptive strategies Human occupation between 1,300 years ago (Late Period) and contact with Spanish colonial forces is archaeologically documented by numerous Kumeyaay/ Diegueno and Luiseno habitation sites. These sites tend to be located in proximity to fresh water and indicate a more sedentary existence for aboriginal groups during the Late Period. Rose Canyon, Sorrento Valley, and Mission Valley are just a few of the areas in the county where these villages were established. Artifacts and cultural patterns reflecting the Late Period occupation are composed of small projectile points, pottery, obsidian from Obsidian Butte, and cremation of deceased group members. The project area falls within the defined boundary of Kumeyaay/Diegueno territory, as Luiseno people are recognized further to the north.

b) Background - History

The earliest historical documentation of the project area is associated with the Rancho Peñasquitos and Rancho San Dieguito Mexican Period land grants. Land grants were

TABLE 4F-2
SUMMARY AND STATUS OF CULTURAL RESOURCE SITES IN SUBAREA III

Site Number	Status	Recommendation	Effect/Implementation	Site Type
SDI-13101H	Not eligible for National Register	Determine State and local significance	Open space - no impact	Historic homestead
SDI-14001H	Not eligible for National Register	Determine State and local significance	Open space - no impact	Historic map location
SDI-6911	Not eligible for National Register	No further work	No significant effect	Habitation
SDI-13099	Not eligible for National Register	No further work	No significant effect	Lithic scatter
SDI-10221	Not eligible for National Register	No further work	No significant effect	Lithic scatter
SDI-6918	Not eligible for National Register	No further work	No significant effect	Camp/habitation
SDI-13096	Potentially eligible for National Register	Avoidance	Destroyed by grading	Habitation
SDI-7206	Not eligible for National Register	No further work	No significant effect	Lithic scatter
SDI-6912	Loci B and E eligible for National Register	Avoidance	Destroyed by grading	Habitation
SDI-14003	Potentially eligible for National Register	Avoidance	Destroyed by grading	Shell midden
SDI-14562	Potentially eligible for National Register	Avoidance	Destroyed by grading	Habitation
SDI-7205	Not significant	Testing completed	No significant effects	Lithic scatter
SDI-6802	Outside project area	Further testing needed	Implement testing program	Camp
SDI-13095	Open space	NA	Index prior to Tentative map	Camp
SDI-13097	Open space	NA	Index prior to Tentative map	Lithic scatter
SDI-13098	Tested	Not significant/no further work	No significant effect	Habitation
SDI-6697/H	Tested/Open space	Avoidance	Index prior to Tentative map	Gonzalez Canyon Adobe
SDI-6696	Tested	Not significant/no further work	No significant effect	Habitation
SDI-6698	Tested	Not significant/no further work	No significant effect	Lithic scatter
SDI-6701	No longer exists	Not significant.	No significant effects	Camp
SDI-6700	Tested	Not significant/no further work	No significant effect	Camp

TABLE 4F-2
SUMMARY AND STATUS OF CULTURAL RESOURCE SITES IN SUBAREA III
(continued)

Site Number	Status	Recommendation	Effect/Implementation	Site Type
SDI-13091	Open space	NA	Index prior to Tentative map	Lithic scatter
SDI-13092	Tested	Not significant/no further work	No significant effect	Lithic scatter
SDI-6913	Tested	Not significant/no further work	No significant effect	Lithic scatter
SDI-6914	Tested	Not significant	No significant effect	Shell midden
SDI-13093	Tested	Not significant	No significant effect	Lithic scatter
SDI-6915	No longer exists	Not significant	No significant effects	Habitation
SDI-6916	Same as SDI-14002/Tested	Not significant	No significant effects	Habitation
SDI-6917	Same as SDI-14002/Tested	Not significant	No significant effects	Habitation
SDI-14002	Tested	Not significant	No significant effects	Camp
SDI-6921	Located on the Brown Parcel	NA	NA	Habitation
SDI-6920H	No longer exists	Not significant	No significant effects	Historic trash
SDI-6919	No longer exists	Not significant	No significant effects	Camp
SDI-13099	Open space	NA	Index prior to Tentative map	Lithic scatter
SDI-10138	No longer exists	Not significant	No significant effects	Lithic scatter
SDI-7201	No longer exists	Not significant	No significant effects	Lithic scatter
SDI-7202	Open space	NA	Index prior to Tentative map	Lithic scatter
SDI-7203	No longer exists	Not significant	No significant effects	Lithic scatter
SDI-7204	Open space	NA	Index prior to Tentative map	Camp

NA = not applicable.

made to Mexican citizens after Spanish colonial rule was ended. The project area was most likely used as range for cattle grazing, a common practice during both the Spanish and Mexican Periods and of early rancho practices. The generally poor quality of grazing, in particular during dry years, made the use of large tracts of land necessary.

Settlement of the study area occurred as a result of other agricultural endeavors. During the American Period, settlement was sparse and significantly affected by environmental conditions that included generally low rainfall, unreliable sources for fresh water or irrigation, and no direct means of transporting goods to a broader market, other than by sea. The latter problem was finally resolved in 1885 with completion of a railway to San Diego.

An 1876 map of the area reveals that limited settlement had occurred within, and directly adjacent to, Pacific Highlands Ranch. A house is shown and labeled as belonging to Rodriguez. In addition, buildings and features associated with the McGonigle family are depicted; including a house, cabin, fence, field, and "county road." As indicated on this map, Carmel Valley was known as Cordero Valley. The valley was named for the original settler, Cordero, who was a retired soldier from the San Diego Presidio. It was the McGonigle family, however, who established homesteads and owned some 2,000 acres of the valley.

A 1901 road survey map also depicts "McGonigle's house," "Ginter's barn," and the road labeled as the Del Mar and Lusardi Road. The location of the road corresponds to the county road shown on the 1876 map. The road, the Rodriguez houses, and McGonigle dwellings are also shown on an official map of San Diego for this period (Beasley 1889). Before the turn of the century, the McGonigle family owned a large portion of land within the project area. Felix McGonigle was the head of the family, which included several sisters and a brother-in-law. Felix came to the United States from Ireland in 1848 and was followed by other members of the family in 1872. The 1900 population census lists Felix McGonigle as a property owner and other family members as partners (U.S. Census). As with many of the early settlers, the McGonigles established numerous timber claims by planting the fast-growing and drought-resistant eucalyptus trees which still dot the hillsides of the project area.

c) Record Search and Literature Review Results

The 1993 survey of the subarea was completed by Gallegos & Associates, resulting in complete coverage of the project area. As reported in the Gallegos document, prior to the 1993 survey, there were 43 archaeological sites and one isolated find recorded in the project area with the SCIC. The Gallegos survey provided information that 15 of the formerly recorded sites and the isolated find were not relocated within the property area. The survey did result in the discovery of an additional 13 sites and 9 isolated finds.

Table 4F-2 provides a summary of the sites and the status of these sites based on available information.

As noted above, 13 of the sites are mapped on the Del Mar Highlands project and were dealt with as part of the environmental review for that project (Norwood and Walker 1979). Among the remaining sites under consideration, 10 are recorded as habitation sites, 15 as lithic scatters, 8 as camps, 4 as historic locations, and 2 as shell middens. CA-SDI-6921 was found to be outside of the project property and is not evaluated here. Several buildings depicted on early maps were not located and were not part of this evaluation effort. A brief description of each of the sites under consideration is provided below. Sites marked with an asterisk were not relocated during the Gallegos survey but were investigated by RECON in order to verify the earlier findings. Sites marked with and asterisk were not relocated during the Gallegos survey of the project area.

CA-SDI-14002 (-6916, -6917)

CA-SDI-14002 is the trinomial that subsumes two previously recorded sites (CA-SDI-6916 and -6917). Richard Norwood recorded CA-SDI-6916 as a portion of a larger complex. During the 1979 field survey the site was noted as having been disturbed by agricultural activity, specifically tomatoes. Norwood and Walker (1979) noted the presence of an artifact scatter and midden soil at this location of CA-SDI-6916, the more westerly of the two areas. The surface scatter of materials included hammerstones, cores, flakes and shatter, scrapers, a blade, metates, manos, shell, and fire-affected rock.

The site visit in 1993 by Gallegos & Associates provides surface dimensions of 100 meters by 130 meters and reiterates the disturbance from agriculture, recent trash, and road grading. The surface artifacts noted in 1993 include 10 cores, 40 plus flakes, 1 mano fragment, 1 hammerstone, and 2 sandstone metate fragments. In addition, some fire-affected rock was noted and a light scatter of *Chione* sp. shell fragments.

At the time of the significance evaluation completed by RECON, the site area was still under cultivation. An intensive site surface survey was completed and artifacts were noted in the central area of the mapped site location. Testing was completed at this location.

CA-SDI-7205

This site, originally evaluated in 1979, was revisited in 1993 by archaeologists from Gallegos & Associates. At the time of the site update the surface items that were observed included "1 mano, 4 cores (porphyritic volcanic), 1 possible metate, and 5 volcanic flakes" and scattered fire-affected rock (Strudwick et al. 1993). The site had been disked a short time before the 1993 site visit. Disking had created a ground surface visibility of some 95 percent.

This site was revisited for significance evaluation by RECON archaeologists. The site was relocated from plotted site information provided by the Gallegos & Associates update. Fallow tomatoes and weeds generally obscured the site surface at the time of the significance evaluation. Dirt roads for maintaining and harvesting tomatoes were present and well maintained.

CA-SDI-13098

This site was one of the sites that was discovered during the Gallegos & Associates survey of the Pacific Highlands Ranch project area in 1993. The size of the site is given as 50 meters by 40 meters and consisted of a scatter of flaked and ground stone artifacts with some shell and fire-affected rock. The site was proposed to have some potential for a subsurface deposit because of the presence of darker soil and evidence of rodent activity.

The surface of the site was disked close to the time of the 1993 inspection making for excellent ground surface visibility. The site was also planted in tomatoes and evidence of agricultural activity was noticeable. This site was revisited by the RECON team and tested for significance.

CA-SDI-6697/H

This site is known as the Gonzalez Canyon adobe. The site represents a fine example of a resource that has been visited, recorded, and tracked for alteration and degradation, over a long period of time. There are site records for this location going back to early 1978 (Hatley and Neeper) with additional visits and recording updates in late 1978 (Norwood), 1984 (Cardenas and Winterrowd), 1986 (Peter), 1993 (Strudwick et al.), and 1998 (Cheever, Collett, and Whitehouse). The result of these numerous visits is a record of alteration and degradation of this location.

The most recent visit to the site location (Strudwick et al. 1993) provides a record of architectural degradation. The adobe walls are recorded at 50 centimeters in height with a wall segment of 2.5 meters being the only standing segment. The exotic trees and patch of cactus were present and the site surface demonstrated a light scatter of debris. A border of PVC pipe was placed around the adobe sometime between 1986 and 1993 and was interpreted as a protective buffer (Strudwick et al. 1993). Agricultural disturbance is noted on the 1993 update as the cause of substantial alteration to the areas surrounding the structure.

CA-SDI-6697/H was revisited by RECON in 1998 and found to be generally consistent with the findings of the 1993 survey. The site is located in the drainage and is outside the areas that have been designated for grading or development. A site update was completed and recommendations for management have been provided.

CA-SDI-13092

This is one of the sites that was discovered by the Gallegos & Associates crew during their survey of the project area. The site record for this site provides a site size of 60 meters by 30 meters with no noticeable deposit depth. The site surface survey yielded two cores and 4fourflakes of a quartzite raw material, leading the team to classify this location as a sparse lithic scatter.

RECON revisited this site in January 1998 and found two flakes and one core on the surface. The extent of the site was reevaluated at 30 meters by 15 meters and there was no evidence of a subsurface deposit. The location matches the description provided by the Gallegos team and was tested for significance by RECON.

CA-SDI-6913

Norwood and Walker originally recorded the site in 1979 as a light density lithic scatter with approximately 15 cores, 10 flakes, and 1 scraper. In addition to the artifact scatter, the recorders noted a "rock alignment" of an irregular but generally rectangular shape measuring 2.2 meters north/south by 1.17 meters east/west (Norwood and Walker 1979).

This site was revisited in 1993 by a team from Gallegos & Associates with a note that the rock feature was not noticeable. The surface artifacts include 7 cores and 40 flakes of volcanic and quartzite stone materials. The team also noted the presence of a well-worn foot trail and the presence of some fire-affected rock. The site area was relocated by RECON archaeologists in January 1998 and tested for significance.

CA-SDI-6914

This site was originally recorded by Norwood and Walker (1979), as a 20-by-20-meter area of dark, sandy clay with some fire-affected rock and two shell fragments. At the time of the original site recording the location was under cultivation in tomatoes.

The site location was revisited by archaeologists from Gallegos & Associates in 1993, who noted that the cultivation was ongoing. The surface survey revealed the presence of one core and one scraper from porphyritic volcanic stone. There was no shell noted on the surface during the 1993 update.

RECON archaeologists revisited this site in January 1998 and found one core and two shell fragments. The site is heavily disturbed from cultivation and the surface materials are sparse. A significance evaluation was completed at this location by RECON.

CA-SDI-13093

This site was recorded in 1993 during the Gallegos & Associates survey of the Pacific Highlands Ranch property. The site is categorized as a temporary habitation area. At the

time of the Gallegos survey the land was fallow; however, evidence of disking and staking was clear. A pedestrian survey of the site located "1 portable mano, 2 cores (quartzite and porphyritic-volcanic), 2 manos, 50+ flakes (1 quartz, 9 quartzite, 40 porphyritic-volcanic)." some fire-affected rock and 6 fragments of marine shell (3 gastropod and 3 *Chione* sp. fragments). The soil on-site was described as a sandy loam with some cobbles on a Plio-Pleistocene marine and non-marine surface.

It appears that this area has been used as cultivated land since the Gallegos survey. The alterations of the land surface from cultivation may have obscured or displaced the artifacts that were noted by the 1993 survey and site recording episode. RECON revisited this location and completed a significance assessment.

CA-SDI-6701*

This site was originally recorded by Richard Norwood as part of the San Dieguito Estates project. The original site record indicates that the site occupied an area of 32 meters by 42 meters and was a scatter of surface artifacts with midden soil. A dirt road hems the site on the north and some disking of site vegetation had occurred.

The site was revisited in 1993 by the Gallegos & Associates team. The location of this site was identified and found to be completely altered from the conditions that were reported in 1978. The survey conclusion was that this site no longer exists.

The site location was revisited by the RECON team in January 1998 with a conclusion that is consistent with the Gallegos survey finding. There is no evidence of an archaeological site at this location; however, every effort was made to identify and sample this resource area.

CA-SDI-6915*

The site area is presently under cultivation and was under cultivation during the original recording in 1979, by Richard Norwood. The area was described as a scatter of surface artifacts with apparent midden soil. The surface items that were inventoried on the site recorded on the site record form include 2 hammerstones, 5 core fragments, flakes and debitage, 5 scrapers, 1 blade, 1 metate fragment, 15 mano fragments, and fire-affected rock. An undetermined quantity of shell was noted and described as weathered and fragmented. Norwood (1979) also noted the collection of the blade, 1 core, and 3 manos from the site surface.

The location of this site was revisited by the Gallegos survey team in 1993 with a negative finding. The site area was consistently altered for agricultural production, between 1979 and 1993 and no evidence of cultural resource material was identified within the mapped site area.

RECON revisited the site location in 1998 and reinforced the finding by the Gallegos team that the site no longer exists. The artifacts from this site appear to have been displaced and potentially reburied by years of discing and planting. This site was determined to have been destroyed by land use activities.

CA-SDI-6920/H*

This site was recorded in 1979 by Richard Norwood as a scatter of historic-era trash. The represented period of deposit was estimated to be between 1890-1915.

This site location was revisited by the Gallegos team in 1993 and found to be part of the Springtime Growers nursery. There was no evidence of the site materials and the archaeological scatter or deposit was absent (Strudwick et al. 1993). The site location was revisited by RECON archaeologists in January 1998 with the same result. This site no longer exists.

CA-SDI-6919*

This small scatter of lithic artifacts was estimated to measure 30 meters by 20 meters and contain 1 mano, 10 flakes, 1 core, and fire-affected rock as well as a light scatter of scallop shell. The condition of this area in 1979 was poor with disturbance from agriculture, a dirt road, and a dirt trench.

This location was revisited by the Gallegos team and found to be part of the Springtime Growers nursery. The site location was covered with potted plants on a bulldozed surface capped with road gravel. There were no archaeological items noted in the vicinity of the mapped location of this site. The survey team concluded that this site had been destroyed by the plant nursery activities.

RECON archaeologists revisited this site location in January 1998 and confirmed the results of the Gallegos survey.

CA-SDI-10138*

The site was recorded in 1984 by Cathy Winterrowd as a small, light density lithic scatter with two loci of concentration. The materials noted at the two loci include flakes, cores, and a scraper. These items were described as metavolcanic and quartzite. The two loci were described as possible quarry areas.

This site was revisited by the Gallegos survey team in 1993. The site location demonstrated evidence of heavy equipment alteration and there were no artifacts identified on the surface of either loci. The site update form indicates that the site was not relocated and that it no longer exists.

RECON revisited this site location during the current work effort and found the damage and conditions to be consistent with the Gallegos finding. The site area appears to have been graded and there is no evidence of cultural material on the surface and no surviving materials or deposits are likely to occur given the amount of disturbance and the thin mantle of soil that exists on this landform.

CA-SDI-7201*

The site is recorded as a small, low-density lithic scatter composed of several pieces of debitage, three flakes, and two cores. The site location was revisited in 1993 by the Gallegos team. The site record update indicates that no cultural debris was found at the mapped site location and the site was believed to have been destroyed.

RECON revisited this location and no cultural resource debris was observed. The site as originally recorded was a light density lithic scatter and the amount of land alteration in the intervening appears to have eliminated all evidence of this resource. This site no longer exists.

CA-SDI-7203*

The site was recorded as a 15-by-15-meter scatter of several flakes and pieces of debitage and one core. The artifacts were found scattered in a wash and were proposed to have been displaced from erosion. This location was revisited by the Gallegos team in 1993 but the artifacts were not relocated. The finding for this site is that it no longer exists.

RECON revisited this site location and found the circumstances to be consistent with the conditions that were identified by the Gallegos team. The low number of items and the apparent placement of those items in an erosional context combined to create a high likelihood of continued displacement and eventual loss. This site no longer exists.

CA-SDI-6921*

This site was originally recorded in 1979 by Richard Norwood as a scatter of artifacts with two "pockets" of midden soil covering an area of approximately 70 by 40 meters. A number of surface items were noted including hammerstones, cores, ground stone tools, and flakes and debitage. The site was classified as a camp with items extending along the top of a small ridge.

The Gallegos survey team visited this site location in 1993. At the time of their survey, the site was described as destroyed by the Springtime Growers business enterprise. The nursery had created a potting area on the surface of this site and all evidence of the site was destroyed or obscured by the activities.

RECON revisited this site location during the current work effort with the same finding. This site has been destroyed by the current land use activity and no evidence of cultural material remains or is suspected.

Cultural Resource Issue	
1.	Would implementation of the Subarea Plan adversely affect archaeological or historical resources?

1) Issue

Would implementation of the Subarea Plan adversely affect archaeological or historical resources?

Impacts

Implementation of the Pacific Highlands Ranch plan would result in impacts to 11 cultural resource sites. This is the number of sites that are plotted within areas of proposed grading under Plan 1 and Plan 2 or alteration and for which prior determinations of significance/importance have not been made. Given the current conceptual grading design conservation through avoidance is accomplished for other 12 sites. Eight additional sites within the project area have previously been determined to be not significant/important and do not require any additional work. The remaining eight sites were not relocated by the Gallegos team. RECON has implemented a testing program to further document the research potential of the 11 sites, which will be impacted by the proposed project. This fieldwork is also intended to verify the destruction of the eight sites that were not relocated during the Gallegos survey. The particularly heavy and persistent winter rains have delayed the completion of testing at all of the sites under evaluation. The results of testing are provided in a technical document and summarized below.

Under the California Environmental Quality Act, Appendix K, Section 21083.2, an important archaeological resource is one which:

- Is associated with an event or person of recognized significance in California or American history or recognized scientific importance in prehistory;

- Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions;

- Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind; and

- Is at least 100 years old and possesses substantial stratigraphic integrity or involves important research questions that historical research has shown can be answered only with archaeological methods.

Based on Ordinance Number 0-18456, adopted on January 12, 1998 amending the Resource Protection Ordinance "Significant prehistoric and historic sites and resources are locations of prehistoric or historic resources that possess unique cultural, scientific, religious, or ethnic value of local, regional, state, or federal importance. The above shall be limited to prehistoric or historic districts, sites, buildings, structures, or objects included in the State Landmark Register, or the City of San Diego Historical Sites Board List, or included in or eligible for inclusion in the National Register of Historic Places, areas of past human occupation where important prehistoric or historic activities or events occurred (such as villages or permanent camps); and locations of past or current traditional religious or ceremonial observances...."

Cultural resource guidelines for the City of San Diego guidelines outline specific measures for completing testing to document site importance through the documentation and evaluation of both surface and subsurface components of the cultural resource area. Complete or partial site evaluations have been completed by RECON at each of the 11 sites under consideration. The findings from this work are presented below with summaries of the work previously completed at the remaining sites.

Each of the 11 sites identified within the area of proposed development, which have not previously been subjected to significance evaluation, were revisited by RECON as part of the current work effort. The results of those visits are provided below on a site-by-site basis.

Based on previously completed testing, cultural resource sites CA-SDI-6912, -13,096, -14,003, and -14,562 have been found to be important/significant sites. Data recovery for CA-SDI-6912, -13,096, -14,003, and -14,562 has been included as a mitigation measure for these important sites in the SR-56 EIR. As shown on Table 4F-2, sites CA-SDI-6912, Loci B and E; -13,096; -14,003; and -14,562 have been determined to be potentially eligible for nomination to the National Register and may also qualify as RPO significant resource areas. The proposed project designs under Plan 1 and Plan 2 would result in impacts to these sites during mass grading. If significant impacts occur at these sites during grading the mitigation measures discussed below would be the obligation of the property owner(s) to fulfill. Should impacts to these sites occur as a result of the construction of SR-56, the completion of mitigation measures will be the responsibility of Caltrans. In the event that these sites are found to be significant under RPO, preservation/protection is the identified approach.

As stated in the SR-56 EIR, impacts to these sites will be mitigated through the implementation of a data recovery plan guided by a research design that identifies the areas of research interest, context, and the data that needs to be collected and the methods of data collection. The anticipated data recovery sampling for these sites is the completion of additional excavation at a level to be determined in a site-specific research design. Sampling at these sites most likely would be completed in 5 percent phases up to a total of 15 percent to extract data for testing research questions of chronology, subsistence, settlement, and cultural interaction. Sampling should include excavation of standard one-meter units as individual probes and in block arrangements with the use of mechanical trenching and eventually controlled site destruction.

CA-SDI-14002 (-6916, -6917)

This composite site area was relocated by RECON and is in an active agricultural field. All of the shovel test pits that were completed at this site were negative for subsurface materials and a surface collection was completed. The remaining site materials appear to be concentrated in a smaller area and may have a subsurface distribution; however, the soil in this area is not particularly deep and there has been a considerable amount of disturbance to this site area.

A point provenience surface collection was completed at this site with the recovery of 2 cores, 10 scrapers, 2 hammerstones, 2 utilized flakes, 1 modified flake, 1 mano, 4 basin fragments, 1 bifacial thinning flake, 3 cortex removal flakes, 26 core reduction flakes, 7 finishing flakes, 2 pieces of primary shatter, and 3 pieces of secondary shatter. Two sample units will be completed at this site to assess the possibility of a subsurface deposit; however, based on the results of the shovel test pits and the relatively small number of surface artifacts over the large site area, the potential for site significance is low.

CA-SDI-13098

This site was relocated and a significance evaluation was completed. An intensive pedestrian survey was completed during which six surface items were located, plotted on the site map, and collected. The surface survey was followed by the excavation of nine shovel test pits which were positioned along cardinal headings at 10-meter intervals. There were no artifacts or ecofacts recovered from the shovel test pits and none are expected at this site. Based on the condition of this location and the small number of artifacts, this site has been determined not to be significant.

This site was relocated and a single core and two pieces of marine shell were identified on the site surface. At the time of the significance evaluation this site was planted with tomatoes and ground surface visibility was fair but disturbance was extensive. These findings are generally consistent with the 1993 survey, which noted two shell fragments, a core, and a scraper. This appears to be a highly disturbed, low-density camp location

which is absent of a quantity, quality, or variety of artifacts and ecofacts as the basis for completing meaningful research.

CA-SDI-13092

This site is bounded on all sides by scraped and tilled land, although the site surface appears to be in relatively good condition. Two flakes and one core were identified on the site surface during the RECON field effort, which is similar to the findings in 1993. This site has degraded over time and the available information appears to be limited. At present it appears that this is a site of limited potential with a small number and nondiagnostic collection of artifacts. Soil formation at this location is generally poor and the likelihood of subsurface materials is low. Sample units will be completed as soon as weather conditions allow. (Significance assessment to be determined upon completion of sample units.)

CA-SDI-13093

This site has been virtually destroyed by agriculture-related grading. The location of the site is scraped and soil has been pushed and redeposited both on and around the mapped site location. There was no evidence of this site found during the RECON site visit and none is expected. Extensive pedestrian survey of the site area failed to yield any evidence of cultural debris. The present conditions and absence of archaeological evidence combine for a finding that this site is not significant.

CA-SDI-6697/H

This is the location of the Gonzalez Canyon adobe. The condition of this site has degraded consistently since the first site record dating to 1979. The house has weathered and the surrounding features and landscape elements have been altered. The location is within a major drainage and as such the location is protected from direct impacts from the proposed development of this project. The location is significant as one of the few surviving examples of the rural pattern of settlement in the project area during the late 1800s and into the early 1900s. The location should be protected and archival and field research should be conducted to provide additional background on this location.

CA-SDI-6913

This site was relocated in 1993 by the Gallegos survey team and 7 cores and somewhat more than 40 flakes were identified. The location was revisited by RECON in 1998 and found to be completely covered in a dense growth of scrub vegetation. Based on the conditions at this site and the proposed limits of grading, evaluation through excavation was not completed. This site is considered to be potentially significant.

CA-SDI-6914

The site was revisited by the Gallegos team in 1993 who noted the site was under cultivation. The team noted one core, one scraper, and no other surface materials. RECON archaeologists revisited the site in 1998 and found one core and two shell fragments. The site is heavily disturbed from cultivation and a significance evaluation is being completed.

CA-SDI-6915

This site was not located by the Gallegos team in 1993 and was not identified by RECON in 1998. This site has been destroyed by agriculture and there are no indications that any materials are present or that if they were present would provide any scientifically meaningful data. This site was determined to be not significant.

CA-SDI-6919

The location of this site was identified within an active plant nursery in 1993 and remains so today. There was no evidence of the site identified in 1993 and that has not changed in the intervening years. This site no longer exists and is not significant.

CA-SDI-6701

This site was not relocated in 1993 with evidence that the ridge on which the site was recorded had been destroyed by grading associated with the development of a residential community to the west. There was no evidence of this site noted in 1998 and the site has been determined as destroyed. This resource area has been determined to be not significant.

CA-SDI-6921

This site was recorded in 1979 as a lithic scatter. The 1993 survey effort did not produce evidence that this site exists and stated that the site had been destroyed. RECON revisited this site in 1998 and found that the resource area no longer exists and, as such, is not a significant resource area.

Significance of Impacts

Twenty-four sites have been found not significant, six sites are in open space areas and should be indexed prior to recording tentative maps for future projects, two sites are in open space and may be potentially significant and require additional evaluation, and one site is located outside of the project boundaries and will require some evaluation when a project is proposed for this property.

The resulting loss of all of the sites on this project is considered a significant cumulative loss of cultural resource information. The destruction of a number of these sites prior to indexing or testing of any kind constitutes a significant impact as important information, which may have been present in these sites, has been lost without record.

There are four sites (CA-SDI-6912, loci B&E, -13,096, 14,003, and -14,562) which have been found to be important/significant resource areas; therefore, impacts to these sites would be considered significant. As presently designed, all of these sites will be destroyed by construction grading. Mitigation of impacts to these sites can be accomplished if they are not found to be significant under the City of San Diego's Resource Protection Ordinance. The current findings for these sites are that they are potentially eligible for nomination to the National Register and are significant under criteria of CEQA. A finding of National Register importance would be viewed as meeting one of the criteria of RPO importance. The State Historic Preservation Officer (SHPO) has not made a finding on the eligibility of these sites as yet. Destruction of a site that is considered to be important under RPO would constitute a significant unmitigated impact. In the event that federal money or federal actions are elements of project development, sites within the project area would be evaluated under Section 106.

Mitigation, Monitoring, and Reporting

Mitigation, monitoring, and reporting steps are a requirement for any site that is found to be significant and where direct or indirect project impacts cannot be avoided. The devising of a project impact mitigation plan is uniquely tied to the particular resource under consideration. The preferred alternative for any significant or important resource area is avoidance. In the event that avoidance is not feasible, some type of impact mitigation must be completed. The level of work is dependent upon the nature, size, and content of the cultural resource site and upon the types of research that can be accomplished through the recovery and analysis of data from the site. Table 4F-2 provides a summary of the findings for the sites in the project area.

Resource sites CA-SDI-13091, CA-SDI-13095, CA-SDI-13097, CA-SDI-13099, CA-SDI-13101H, CA-SDI-14001H, CA-SDI-7202, CA-SDI-7204, and CA-SDI-6697/H are avoided by the present construction grading design which places these sites in open space. As specific project plans are proposed some level of site assessment would be required. In the event that these sites will remain in open space the minimal treatment would be the completion of a site indexing which would provide a baseline of information on the deposit content. Indexing would involve the excavation of a minimum of two sample units and a report of findings with updated site record information and recommendations for permanent preservation.

Testing and survey reconnaissance indicate that CA-SDI-13093, CA-SDI-13098, CA-SDI-6914, and CA-SDI-7205 do not contain meaningful information and that additional sampling will not provide the scientific community or public with previously unknown information regarding the prehistoric past. No further work is recommended for these sites.

CA-SDI-14002 (-6916, -6917), CA-SDI-13092, and CA-SDI-6913 are considered potentially significant until fieldwork can be completed to assess their condition and data content. This work is presently being accomplished.

Eight recorded sites were not relocated because they no longer exist. These sites do not require any additional investigation. These sites include CA-SDI-10138, CA-SDI-6701, CA-SDI-6915, CA-SDI-6919, CA-SDI-6920H, CA-SDI-6921, CA-SDI-7201, and CA-SDI-7203. An additional eight sites within the Pacific Highlands Ranch project area were found to not require any adalitional investigation as they have previously been determined to be nonsignificant resource areas. These include CA-SDI-10221, CA-SDI-13099, CA-SDI-6696, CA-SDI-6698, CA-SDI-6700, CA-SDI-6911, CA-SDI-6918, and CA-SDI-7206.

Archaeological collections will be stored at an appropriate curatorial facility.

G. Air Quality

Existing Conditions

a) Climate

The project area, like the rest of San Diego County's coastal areas, has a cool, semiarid steppe climate characterized by warm, dry summers and mild, wet winters. The dominating permanent meteorological feature affecting the region is the Pacific High Pressure Zone, which produces the prevailing westerly to northwesterly winds. The study area has a mean annual temperature of 62 degrees Fahrenheit (F) and an average annual precipitation of 10 inches, falling primarily from November to March. Winter low temperatures at the site average about 45 degrees F, and summer high temperatures average about 75 degrees F (U.S. Department of Commerce 1992; Pryde 1976).

Prevailing conditions along the coast are modified by the daily sea breeze/land breeze cycle. Fluctuations in the strength and pattern of winds from the Pacific High Pressure Zone interacting with the daily local cycle produce periodic temperature inversions that influence the dispersal or containment of air pollutants in the San Diego Air Basin (SDAB). The afternoon temperature inversion height, beneath which pollutants are trapped, varies between 1,500 and 2,500 feet MSL. The altitude beneath the inversion layer is the mixing depth for trapped pollutants. In winter, the morning inversion layer is about 800 feet MSL, or about 425 feet above the project site. In summer, the morning inversion layer is about 1,100 feet MSL. A greater change between morning and afternoon mixing depth increases the ability of the atmosphere to disperse pollutants. Generally, therefore, air quality at the site is better in winter than in summer.

The predominant pattern is sometimes interrupted by the so-called Santa Ana conditions, when high pressure over the Nevada-Utah area overcomes the prevailing westerlies, sending strong, steady, hot, dry northeasterly winds over the mountains and out to sea. Strong Santa Anas tend to blow pollutants out over the ocean, producing clear days. However, at the onset or breakdown of these conditions, or if the Santa Ana is weak, air quality may be adversely affected. In these cases, emissions from the South Coast Air Basin to the north are blown out over the ocean, and low pressure over Baja California draws this pollutant-laden air mass southward. As the high pressure weakens, prevailing northwesterlies reassert themselves and send this cloud of contamination ashore in the SDAB. There is a potential for such an occurrence about 45 days of the year, but San Diego is adversely affected on only about 5 of them. When this impact does occur, the combination of transported and locally produced contaminants produces the worst air quality measurements recorded in the basin.

b) Regulatory Framework

Federal Regulations

The federal Clean Air Act was enacted in 1970 and amended in 1977 and 1990 [42 U.S.C. 7506(c)] for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity.

In 1971, in order to achieve the purposes of Section 109 of the act, the Environmental Protection Agency (EPA) developed primary and secondary national ambient air quality standards (NAAQS). Six pollutants of primary concern were designated: ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, and suspended particulates (PM-10). The primary NAAQS must, "allowing an adequate margin of safety," "protect the public health" and the secondary standards must "protect the public welfare from any known or anticipated adverse effects" (1990 Clean Air Act, Section 109). "Public welfare" includes tangible and intangible things such as aesthetics, agriculture, and architecture. The primary standards were established, with a margin of safety, considering long-term exposures for the most sensitive groups in the general population (i.e., children, senior citizens, and people with breathing difficulties).

If an air basin is not in federal attainment for a particular pollutant, the basin is classified as marginal, moderate, serious, severe, or extreme. Additionally, under San Diego's current federal classification as a serious nonattainment area for ozone, the Clean Air Act specifies several requirements, including (County of San Diego 1995):

- Federal ozone standard attainment by 1999 and a demonstration that the State Implementation Plan provides for attainment.
- Emissions reduced 15 percent between 1990 and 1996 and reduced 3 percent each year thereafter until attainment.
- Transportation control measures if vehicle travel and emissions exceed attainment demonstration levels.

The EPA allows the states the option to develop different (stricter) standards, which California has adopted. Table 4G-1 lists the federal and California state standards.

State Regulations

As discussed above, the State of California has set more stringent limits on the six pollutants of national concern (see Table 4G-1).

Assembly Bill (AB) 2595 became effective on January 1, 1989, and requires that districts implement regulations to reduce emissions from mobile sources through the adoption and

TABLE 4G-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Maximum Concentration Averaged over Specified Time Period	
	State Standard	Federal Standard
Oxidant (ozone)	0.09 ppm (180 $\mu g/m^3$) 1 hr.	0.12 ppm (235 $\mu g/m^3$) 1 hr.
Carbon monoxide	9.0 ppm (10 mg/m^3) 8 hr.	9 ppm (10 mg/m^3) 8 hr.
Carbon monoxide	20.0 ppm (23 mg/m^3) 1 hr.	35.0 ppm (40 mg/m^3) 1 hr.
Nitrogen dioxide	0.25 ppm (470 $\mu g/m^3$) 1 hr.	0.053 ppm (100 $\mu g/m^3$) Annual Average
Sulfur dioxide	0.25 ppm (655 $\mu g/m^3$) 1 hr.	0.03 ppm (80 $\mu g/m^3$) Annual Average
Sulfur dioxide	0.04 ppm (105 $\mu g/m^3$) 24 hr.	0.14 ppm (365 $\mu g/m^3$) 24 hr.
Suspended particulate matter (PM-10)	50 $\mu g/m^3$ 24 hr.	150 $\mu g/m^3$ 24 hr.
Suspended particulate matter (PM-10)	30 $\mu g/m^3$ Annual Geometric Mean	50 $\mu g/m^3$ Annual Arithmetic Mean
Lead	1.5 $\mu g/m^3$ 30-day Average	1.5 $\mu g/m^3$ Calendar Quarter

SOURCE: State of California 1996.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

enforcement of transportation control measures. As a state serious ozone nonattainment area, San Diego is subject to various requirements including (County of San Diego 1995):

- Five percent annual reduction in hydrocarbons and oxides of nitrogen emissions from 1987 until standards are attained. If this five percent reduction cannot be obtained, every feasible measure must be implemented.

- Transportation control measures to achieve an average of 1.4 persons per passenger vehicle during weekday commute hours by 1999 or programs providing equivalent emission reductions not otherwise required.

State Implementation Plan

The State Implementation Plan (SIP) is the document which sets forth the state's strategies for achieving air quality standards. The San Diego Air Pollution Control District (APCD) is responsible for preparing and implementing the portion of the SIP applicable to the SDAB. The San Diego APCD adopts rules, regulations, and programs to attain state and federal air quality standards and appropriates money (including permit fees) to achieve these objectives.

California Environmental Quality Act

Section 15125(b) of the CEQA Guidelines contains specific reference to the need to evaluate any inconsistencies between the proposed project and applicable general plans and regional plans. Regional plans include the applicable air quality management plan, which is the Regional Air Quality Strategy (RAQS) in the San Diego Air Basin.

Local Regulations

The San Diego APCD is the agency that regulates air quality in the SDAB. The APCD prepared the 1991/1992 RAQS in response to the requirements set forth in AB 2595. The draft was adopted, with amendments, on June 30, 1992 (County of San Diego 1992). Attached as part of the RAQS are the transportation control measures (TCM) for the air quality plan prepared by the San Diego Association of Governments (SANDAG) in accordance with AB 2595 and adopted by SANDAG on March 27, 1992, as Resolution Number 92-49 and Addendum. The required triennial update of the RAQS and corresponding TCM were adopted on December 12, 1995. The RAQS and TCM Plan set forth the steps needed to accomplish attainment of state and federal ambient air quality standards.

The APCD has also established a set of Rules and Regulations initially adopted on January 1, 1969, and periodically reviewed and updated. The Rules and Regulations define requirements regarding stationary sources of air pollutants and fugitive dust.

c) Existing Air Quality

The project area is within the SDAB. Air quality at a particular location is a function of the kinds and amounts of pollutants being emitted into the air locally and throughout the basin, and the dispersal rates of pollutants within the region. The major factors affecting pollutant dispersion are wind speed and direction, the vertical dispersion of pollutants (which is affected by inversions), and the local topography.

Air quality is commonly expressed as the number of days in which air pollution levels exceed state and federal standards, as set by the California Air Resources Board (CARB) and the EPA, respectively (see Table 4G-1). The concentration of pollutants within the SDAB is measured at 10 stations maintained by the San Diego APCD and the CARB. The station nearest the project measuring a full range of pollutants (except for lead) is in Kearny Mesa, southeast of the project site. Ozone levels are also measured at a station in Del Mar. The nearest station that has monitored particulates (PM-10) for the entire period from 1991 to 1995 is the Oceanside-Mission Avenue monitoring station. Although none of these stations monitors lead concentrations, lead levels measured at other monitoring stations in the SDAB are well below both federal and state standards.

Table 4G-2 summarizes the number of days annually from 1991 to 1995 during which state and federal standards were exceeded in the SDAB overall, while Table 4G-3 lists these data for the Kearny Mesa, Del Mar, and Oceanside monitoring stations.

Ozone

The air basin is currently designated a state "serious" nonattainment area and a federal "serious" nonattainment area for ozone. Peak ozone concentrations have steadily declined since 1978 (as reported by SANDAG's 1994 Regional Transportation Plan). In 1994, San Diego exceeded the state standard for ozone on 79 days compared with 158 in 1989. Federal standards were exceeded on 9 days compared with 55 days in 1989 (County of San Diego 1995). Of the nine monitoring stations in the SDAB which monitor ozone, only the mountain slopes station at Alpine exceeded the federal air quality standard for ozone in 1994. This was the first time that just a single station has exceeded federal standards since air quality monitoring began in 1955 (County of San Diego 1995). However, the federal standard was exceeded at six of the monitoring stations during 1995.

Table 4G-2 shows that in 1993, 1994, and 1995, the federal ozone standard was exceeded on 14, 9, and 12 days, respectively. During these years, the state ozone standard was exceeded on 89, 79, and 96 days, respectively. The federal standard for ozone was not exceeded during 1995 at the Kearny Mesa and Del Mar monitoring stations. However, the state standard for ozone was exceeded on 8 and 12 days during the same year at these stations, respectively.

TABLE 4G-2
SUMMARY OF AIR QUALITY DATA
FOR THE SAN DIEGO AIR BASIN

Pollutant	Number of Days Over Standard									
	State					Federal				
	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
Ozone (O_3) - 1 hour	106	97	89	79	96	27	19	14	9	12
Carbon monoxide (CO) - 8 hour	0	0	0	0	0	0	0	0	0	0
Carbon monoxide (CO) - 1 hour	0	0	0	0	0	0	0	0	0	0
Nitrogen dioxide (NO_2) - State 1 hour; Federal annual avg.	0	0	0	0	0	NE	NE	NE	NE	NE
Sulfur dioxide (SO_2) State 1 hour; Federal annual average	0	0	0	0	0	NE	NE	NE	NE	NE
Particulates* (PM-10) - 24 hour	20/83	7/75	14/76	25/87	23/88	0/83	0/75	0/76	0/87	0/88
Lead (Pb) - State 30-day average; Federal calendar quarter	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

SOURCE: State of California 1992, 1993b, 1994, 1995, 1996

*Number of samples over standard/number of samples collected.

NE: standard not exceeded.

TABLE 4G-3
NUMBER OF DAYS AIR QUALITY STANDARDS WERE EXCEEDED AT KEARNY MESA, OCEANSIDE, AND DEL MAR MONITORING STATIONS

Pollutant	Year				
	1991	1992	1993	1994	1995
Kearny Mesa Station					
Ozone					
Federal 1-hour standard (0.12 ppm, 235 µg/m³)	8	6	3	0	0
State 1-hour standard (0.09 ppm, 180 µg/m³)	25	15	15	2	8
Carbon Monoxide					
Federal 8-hour average (9 ppm, 10 mg/m³)	0	0	0	0	0
State 8-hour average (9.0 ppm, 10 mg/m³)	0	0	0	0	0
State 1-hour average (20 ppm, 23 mg/m³)	0	0	0	0	0
Nitrogen Dioxide					
Federal annual average (0.053 ppm, 100 µg/m³)§	0.027	0.024	0.023	0.024	0.024
State 1-hour standard (0.25 ppm, 470 µg/m³)	0	0	0	0	0
Sulfur Dioxide					
Federal annual average (0.03 ppm, 80 µg/m³)§	0.002	0.004	0.002*†	NR	NR
State 1-hour average (0.25 ppm, 655 µg/m³)	0	0	0†	NR	NR
State 24-hour average (0.04 ppm, 105 µg/m³)	0	0	0†	NR	NR
Suspended 10-Micron Particulate Matter (PM-10)					
Federal 24-hour average (150 µg/m³)‡	NR	NR	0/16	0/57	0/55
Federal annual arithmetic mean (50 µg/m³)§	NR	NR	32.6*	30.0*	32.2*
State 24-hour average (50 µg/m³)‡	NR	NR	3/16	1/57	6/55
State annual geometric mean (30 µg/m³)§	NR	NR	27.1*	28.1*	27.5*
Oceanside Station					
Suspended 10-Micron Particulate Matter (PM-10)					
Federal 24-hour average (150 µg/m³)‡	0/60	0/57	0/61	0/63	0/59
Federal annual arithmetic mean (50 µg/m³)§	36.8*	29.1*	28.9	29.1	29.7
State 24-hour average (50 µg/m³)‡	9/60	0/57	2/61	3/63	4/59
State annual geometric mean (30 µg/m³)§	34.0*	27.8*	26.4	27.2	27.0
Del Mar Station					
Ozone					
Federal 1-hour standard (0.12 ppm, 235 µg/m³)	7	3	3	0	0
State 1-hour standard (0.09 ppm, 180 µg/m³)	28	19	19	4	12

SOURCE: State of California 1992, 1993b, 1994, 1995, 1996.

ppm - parts per million
mg/m³ - milligrams per cubic meter
µg /m³ - micrograms per cubic meter
NR - not reported at this station

*Data presented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA and/or CARB criteria for representativeness.
†Monitoring of this pollutant was discontinued during 1993.
‡Number of samples over standard/number of samples collected.
§Data shown are in µg/m³.

Ozone presents special control strategy difficulties in the SDAB because of climatological and meteorological factors. Ozone is the end product of a chain of chemical reactions that produces photochemical smog from hydrocarbon emissions. A major source of hydrocarbon emissions is motor vehicle exhausts. In the SDAB, only part of the ozone contamination is derived from local sources; under certain conditions, contaminants from the South Coast Air Basin (such as the Los Angeles area) are windborne over the ocean into the SDAB. When this happens, the combination of local and transported pollutants produces the highest ozone levels measured in the basin.

In 1992, pollution transported from the Greater Los Angeles area was responsible for 11 out of 19 days over federal standards. On average, approximately 42 percent of the days over state standards since 1987 were attributable to pollution transported from Los Angeles (SANDAG 1994:249-250). Although during 1994 ozone concentrations in San Diego County exceeded the federal ozone air quality standard on nine days, on only two of those days was the peak ozone concentration attributed primarily to emission sources within San Diego County. On the other seven days, ozone transported into San Diego from the South Coast Air Basin was a significant factor (County of San Diego 1995).

Local agencies can control neither the source nor the transportation of pollutants from outside the basin. The APCD's policy, therefore, has been to control local sources effectively enough to reduce locally produced contamination to clean air standards. The 1994 Regional Transportation Plan concludes that ozone remains the major primary pollutant in the San Diego region.

Carbon Monoxide

No violations of the state standard have been recorded for carbon monoxide since 1991 and the basin is classified as a state attainment area for carbon monoxide. The basin currently is classified as a federal nonattainment area for carbon monoxide; however, no violations of the federal standard have been recorded since 1989. The APCD plans to apply to the EPA for reclassification of the basin to a federal attainment area for carbon monoxide, but has not initiated the process (County of San Diego 1997). Moreover, it should be noted that the state standard for carbon monoxide is more stringent than the federal standard.

Particulates (PM-10)

Particulates within the respirable range (10 microns in size or less) are reported as both an annual average and a 24-hour average. The basin overall is currently in attainment of the federal standard, although the basin is unclassified for inhalable particulates (County of San Diego 1995). However, the basin has not met the more stringent state standard. For several reasons hinging on the area's dry climate and coastal location, the SDAB has special difficulty in developing adequate tactics to meet present state particulate standards.

Nitrogen Dioxide, Sulfur Dioxide, and Lead

The basin is in attainment for these pollutants.

d) Standards and Criteria

California Air Resources Board Guidelines

For long-term emissions, the direct impacts of a project can be measured by the degree to which the project is consistent with regional plans to improve and maintain air quality. The regional plan for San Diego is the 1991/1992 RAQS and attached TCM Plan, as revised by the triennial update adopted on December 12, 1995. The CARB provides criteria for determining whether a project conforms with the RAQS (State of California 1989), which include the following:

1. Is a regional air quality plan being implemented in the project area?
2. Is the project consistent with the growth assumptions in the regional air quality plan?
3. Does the project incorporate all feasible and available air quality control measures?

City of San Diego

The City of San Diego's Significance Determination Guidelines (1993) provide several criteria for determining significant air quality impacts based on projected ADT and roadway levels of service.

1. In areas where traffic flow is not generally below LOS C and development is not located within 1,000 feet of a congested freeway, significant cumulative air quality impacts would occur from construction of multi-family units or commercial development generating more than 9,300 ADT or from construction of 930 single-family units (City of San Diego 1993).

2. In densely urbanized areas where there is traffic congestion or where development is located near congested freeways, significant cumulative air quality impacts would occur from construction of multi-family units or commercial development generating more than 6,500 ADT or from construction of 650 single-family units (City of San Diego 1993).

Additionally, local air quality impacts can also occur if traffic generated in the project area were to result in inadequate traffic flow. Substandard levels of service (below LOS D) create additional delays at the intersections which result in longer idling times for vehicles. Under the City's Significance Determination Guidelines, development which would cause the level of service on a six-lane prime arterial to degrade from LOS A, B, or C to LOS E or F or to degrade from LOS D to LOS F would result in a significant air quality impact. Significant air quality impacts would also occur if development caused

levels of service on four-lane prime arterials and major roads to degrade to LOS F (City of San Diego 1993).

Air Quality Issue

1. Would implementation of the Pacific Highlands Ranch Plan affect the ability of the County to meet the federal clean air standards according to the Regional Air Quality Strategy?

1) Issue

Would implementation of the Pacific Highlands Ranch Plan affect the ability of the County to meet the federal clean air standards according to the Regional Air Quality Strategy?

Impacts

a) Construction Emissions

During construction, temporary emissions would be generated by construction equipment used to build the proposed project. Grading would disturb surface soils and cause a discharge of particulates into the air. Dust control during grading operations would be regulated in accordance with the rules of the San Diego APCD and the regulations of the City of San Diego Land Development Ordinance. All project construction is required to include the following measures to reduce fugitive dust impacts:

1. All unpaved construction areas shall be sprinkled with water or other acceptable San Diego APCD dust control agents during dust-generating activities to reduce dust emissions. Additional watering or acceptable APCD dust control agents shall be applied during dry weather or windy days until dust emissions are not visible.

2. Trucks hauling dirt and debris shall be covered to reduce windblown dust and spills.

3. On dry days, dirt or debris spilled onto paved surfaces shall be swept up immediately to reduce resuspension of particulate matter caused by vehicle movement. Approach routes to construction sites shall be cleaned daily of construction-related dirt in dry weather.

4. On-site stockpiles of excavated material shall be covered or watered.

Additionally, construction would be a one-time, short-term activity.

b) Developed Condition Emissions

The primary air quality impacts which would occur from the future development of the proposed project area would be air pollutant emissions from automobile and truck traffic to and from the development. Additional local emissions would result from the burning of natural gas for space and water heating, fireplace emissions, and basinwide emissions from power plants generating electricity for use in the development.

The proposed project site is in the city of San Diego, which is within the San Diego Air Basin. The 1991/1992 RAQS, as updated in 1995, will be implemented by APCD throughout the air basin. Therefore, the proposed project fulfills the first criteria from the CARB guidelines described in Existing Conditions.

Normally, if a project is consistent with the City's General Plan or community plan, it can be considered consistent with the growth assumptions in the RAQS (State of California 1989). The proposed Pacific Highlands Ranch Plan project would generally comply with the land use goals, objectives, and recommendations of the Progress Guide and General Plan, the Framework Plan, and City Council Policies 600-29 and 600-30. Furthermore, the proposed project would dedicate open space land consistent with the Framework Plan Environmental Tier. Therefore, it can be concluded that the proposed project is consistent with the growth assumptions in the RAQS.

However, the proposed project would develop up to 4,97~~440~~ residential units which exceeds the City's thresholds for significant cumulative air quality impacts. Cumulative air quality impacts are discussed in Chapter 6 of this EIR.

c) Forecasted Traffic Conditions

Mobile sources (motor vehicles) account for a large portion of the current emissions of carbon monoxide, nitrogen oxides, and volatile organic gases in the San Diego Air Basin. Localized elevated levels of pollutants above the air basin's ambient conditions can occur adjacent to roadways if the roadways' levels of service are substandard, resulting in slower traffic, stop-and-go traffic, and increased delays at intersections. A degraded LOS would cause individual cars to emit more pollutants for a longer period of time as they travel through an area.

As discussed in the Traffic Circulation section of this EIR, all roadways and intersections within the Pacific Highlands Ranch project area are projected to operate at LOS D or better. Although off-site roadway segments and intersections are projected to operate at LOS E or F in the future, these reduced levels of service are the result of non-Pacific Highlands Ranch developments.

Significance of Impacts

a) Construction Emissions

Dust control during grading operations would be regulated in accordance with the rules of the San Diego APCD and the regulations of the City of San Diego Land Development Ordinance. Additionally, construction would be phased and construction of each phase would be a one-time, short-term activity, air quality impacts due to construction of the proposed project would not be significant.

b) Developed Condition Emissions

The proposed project would be consistent with the RAQS and would not create direct traffic impacts to the surrounding street system provided that the recommended road improvements are constructed. Therefore, direct air quality impacts would not occur if the proposed project were implemented.

The proposed project would result in significant cumulative air quality impacts under the City's significance thresholds as discussed in Chapter 6 of this EIR.

c) Forecasted Traffic Conditions

Development of the proposed project would not directly result in roadway or intersection levels of service below D. Therefore, no significant direct air quality impacts are anticipated. Cumulative air quality impacts would be significant.

Mitigation, Monitoring, and Reporting

No significant direct air quality impacts would be anticipated with approval of the proposed project. No mitigation is available for cumulative air quality impacts at the project level. The project's contribution to cumulative air quality impacts is discussed in Chapter 6, Cumulative Effects. The No Project alternative would avoid potential significant air quality impacts

H. Geology/Soils/Erosion

A geotechnical feasibility study (Pacific Soils Engineering, Inc. 1984) and a geologic reconnaissance report (Pacific Soils Engineering, Inc. 1989) were prepared for large portions of the proposed project site. More recently, a preliminary geologic and geotechnical report (Converse Consultants West 1993) has been prepared for the entire Pacific Highlands Ranch. In addition to these documents, the Black Mountain Ranch North and South Final EIR (City of San Diego 1992b) and the NCFUA Framework Plan EIR (City of San Diego 1992b) have addressed geology and soils for the project region. The following text includes findings and conclusions from these reports.

Existing Conditions

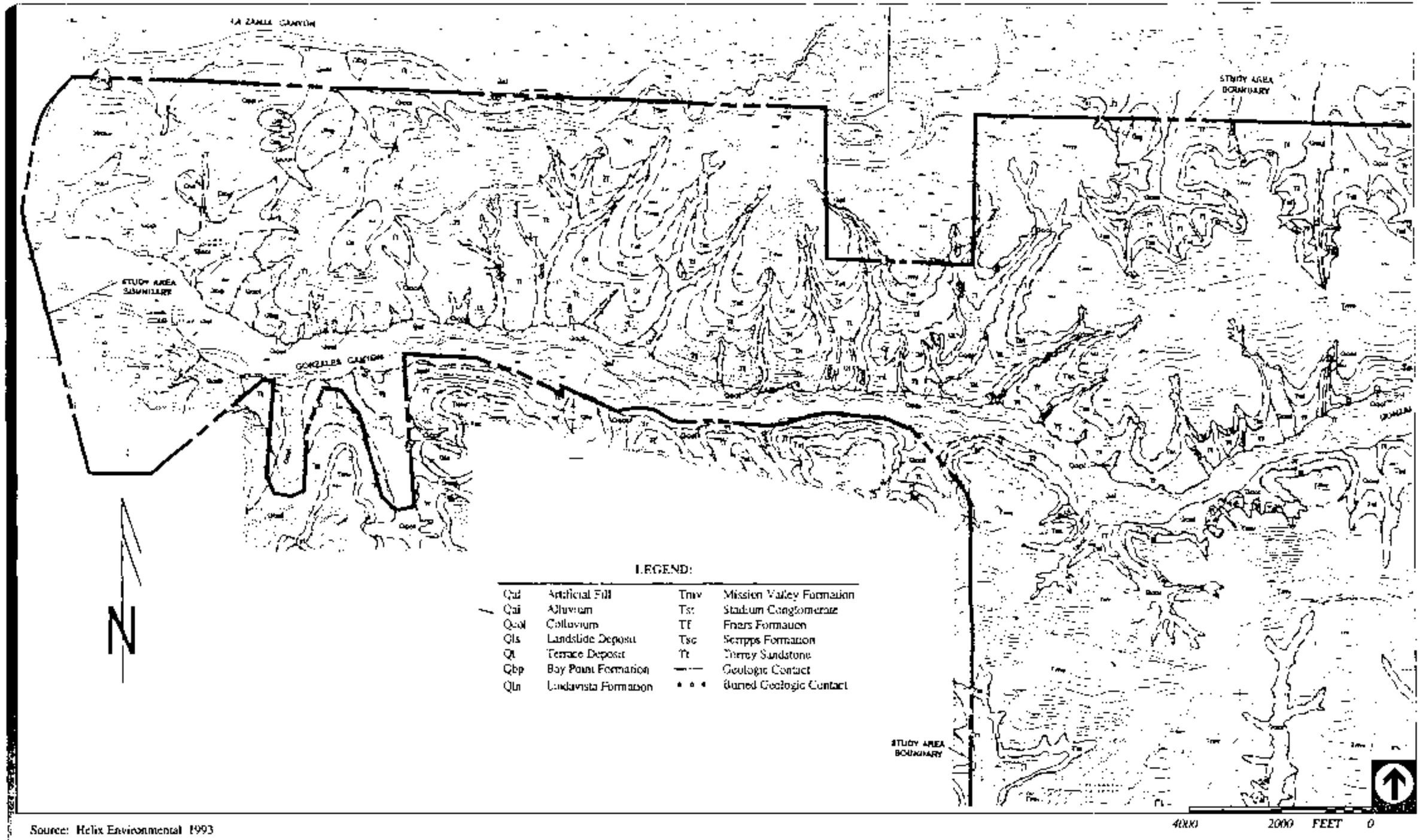
The topography of the project area ranges from nearly flat mesas and riverbeds to rugged, steeply sloping hillside terrain with a maximum of 290 vertical feet of relief. On-site elevations range from approximately 40 feet above MSL in the northwestern end of the project area to approximately 427 feet above MSL in the southeastern corner of the subarea near Del Mar Mesa. Three major canyons transect the site: Gonzales Canyon in the northwest and McGonigle and Deer Canyons in the southeast. Gonzales Canyon empties to the west into the San Dieguito Valley and is the primary drainage for the upland mesa areas north of Black Mountain Road. McGonigle Canyon, which is separated from Deer Canyon by the Santa Monica Ridge, is the primary drainage for the upland hills south of Black Mountain Road. Deer Canyon is the major drainage for the area south of Santa Monica Ridge. McGonigle and Deer Canyons meet at the western end of the Santa Monica Ridge and act as tributaries to the Carmel Valley drainage, in the southwestern portion of the project.

a) Geologic Formations

Eleven geologic units were mapped on the site. These include five Eocene sedimentary formations—the Torrey Sandstone, the Scripps Formation, the Friars Formation, Stadium Conglomerate, and the Mission Valley Formation—and six Quaternary units—the Lindavista Formation, the Bay Point Formation, river terrace deposits, alluvium, recent colluvium, and landslide deposits. Two additional surficial materials, topsoil and artificial fill, were observed on-site. These surficial deposits and geologic formations are discussed below and their locations in Pacific Highlands Ranch are shown on Figures 4H-1 to 4H-3.

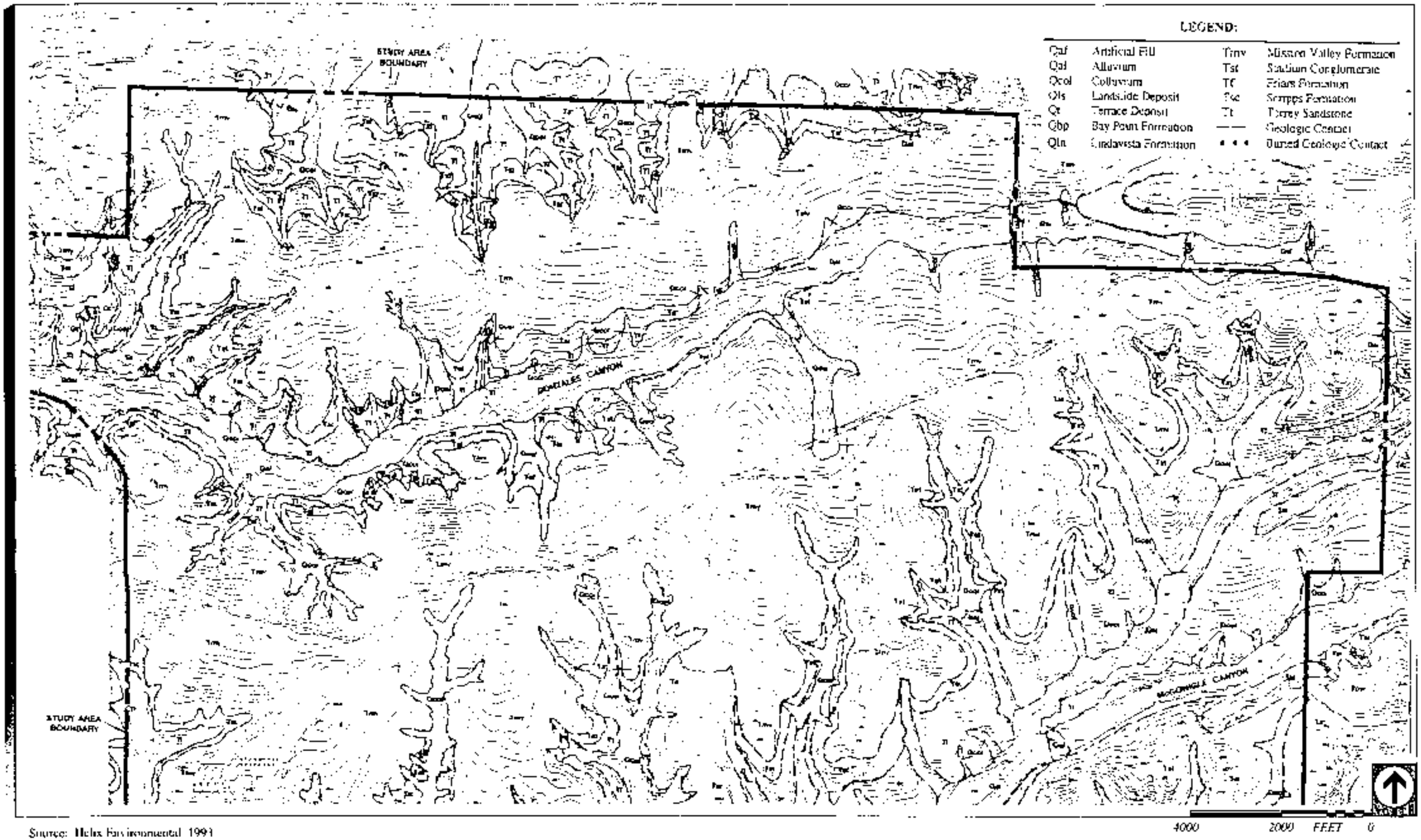
Torrey Sandstone (Tt)

The Torrey Sandstone consists of dense sandstone, which appears to be stable when exposed in cut slopes. The sandstone possesses relatively high shear strength, a low



Source: Helix Environmental 1993

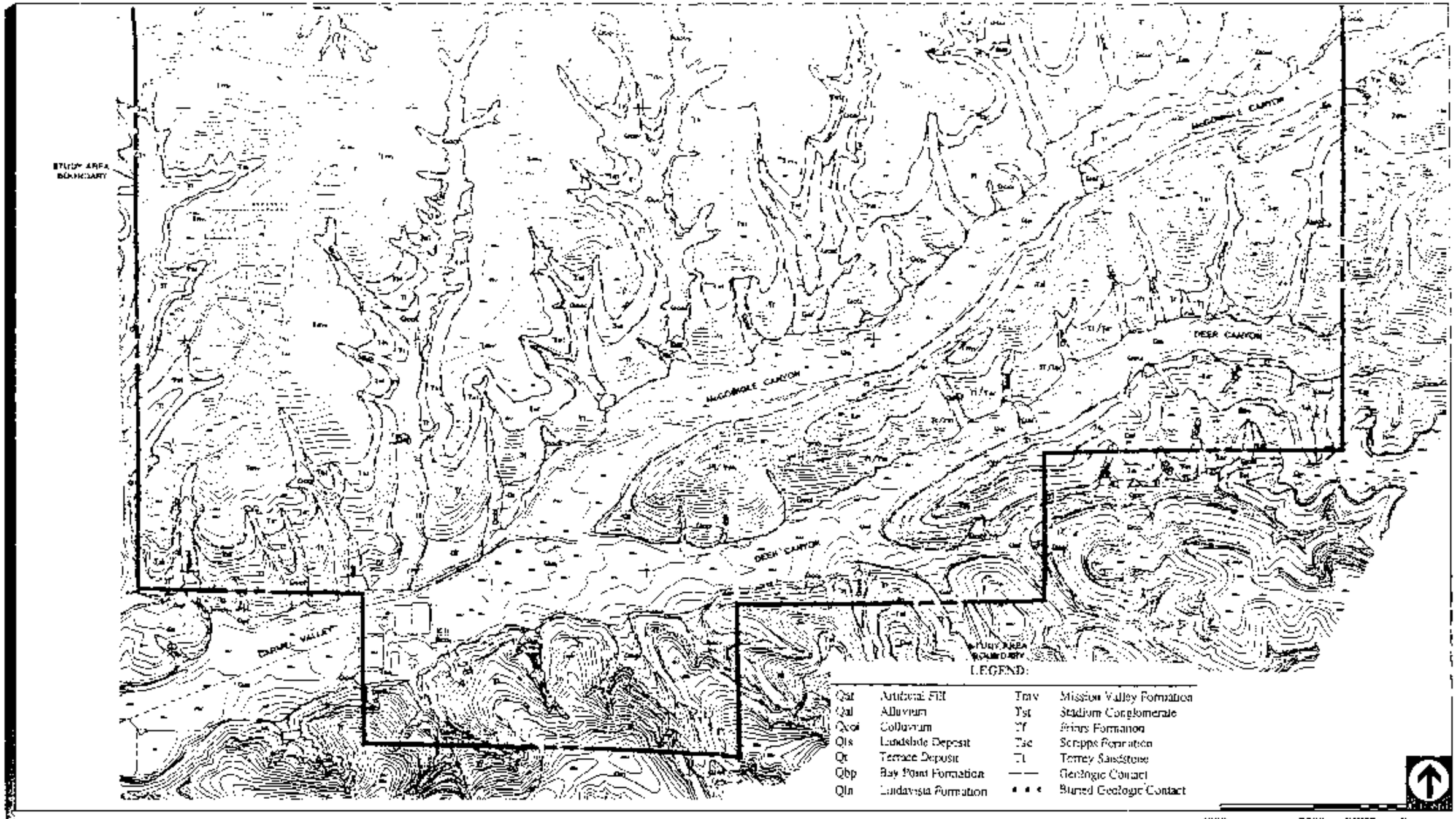
FIGURE 4H-1
Site Geology, Western Portion



Source: Helix Environmental 1991

FIGURE 4H-2

Site Geology, Northeastern Portion



Source: Helix Environmental 1993

FIGURE 4H-3

Site Geology, Southeastern Portion

expansive potential, and low compressibility characteristics in both an undisturbed or properly compacted condition. It should therefore provide suitable foundation support.

Scripps Formation (Tsc)

The Scripps Formation outcrops in a very limited area in the southwestern portion of the subarea, on the south side of Carmel Valley (Pacific Soils Engineering, Inc. 1989). This formation consists of yellowish brown sandstone and occasional conglomerate interbeds, which typically exhibit favorable geotechnical characteristics.

Friars Formation (Tf)

The Friars Formation consists of relatively dense, clayey sandstone and sandy claystone. The sandstone and claystone are relatively unstable when exposed in cut slopes. In addition to possessing relatively low shear strength, the more clayey portions of this formation are highly expansive. This formation is considered by the City's Seismic Safety Study to be slide-prone (City of San Diego 1983).

Stadium Conglomerate (Tst)

The Stadium Conglomerate, consisting of very dense, clayey sand, gravel, and cobbles, was found to overlie the Friars Formation and Torrey Sandstone. On the hillsides of the southeastern portion of the site, the Stadium Conglomerate and Friars Formation are interbedded and are distinguishable only by their stratigraphic position. This area has been mapped as Tf/Tst. The Stadium Conglomerate typically exhibits favorable geotechnical engineering properties.

Mission Valley Formation (Tmv)

The Mission Valley Formation outcrops predominantly in the northern portion of the property, overlying the Stadium Conglomerate. This geologic unit is generally comprised of relatively dense sandstone interbedded with siltstone and claystone. It is anticipated that significant quantities of low expansive sand occur within this unit.

Lindavista Formation (Qln)

The Lindavista Formation caps some of the higher benches on the site north of Gonzales Canyon and south of Deer and McGonigle Canyons. This unit consists of well-consolidated, weakly cemented cobble conglomerates. The Lindavista Formation typically exhibits very good geotechnical characteristics. Moderately heavy to heavy ripping should be anticipated during grading within this unit. Due to the high cobble content, this formation is generally considered to be less desirable for capping building pads than sandstone of the Mission Valley Formation or Torrey Sandstone. Cut or fill slopes should possess adequate stability if graded at inclinations of 1.5:1 and 2:1, respectively. The soil matrix of the conglomerate is generally of a low expansive

potential and should provide adequate bearing capacity for the support of conventional spread footings.

Bay Point Formation (Qbp)

The Bay Point Formation occurs in the northwestern portion of the site north of Gonzales Canyon. This formation is composed of mostly marine and nonmarine, poorly consolidated, fine- and medium-grained, pale brown, fossiliferous sandstone. The marine part of the formation interfingers with unfossiliferous sandstone that lies generally more than 100 but less than 200 feet above sea level (NCFUA plan). Typically, the Bay Point Formation exhibits a low to moderate expansion potential and generally good geotechnical characteristics. Slope instability in this formation has been observed at the site.

Terrace Deposits (Qt)

Thin stream terrace deposits form low benches along Gonzales and McGonigle Canyons in the project area. These deposits typically consist of dense, weakly cemented cobble conglomerates and sandstones, generally possessing excellent bearing characteristics in both a natural and properly compacted condition.

Alluvium (Qal)

Alluvial deposits of 5 to over 25 feet deep are found predominantly in the bottom of Gonzales, McGonigle, and Deer Canyons on the project site. The alluvium consists of silty sands to silts and may contain a large amount of cobbles and some boulders within the main streambeds. In general, the alluvial deposits are soft and porous, thus unsuitable for supporting engineered fills and/or structures.

Colluvium (Qcol)

Colluvial materials located on-site consist of silty sands to sandy clays with cobble-sized rock fragments and have an estimated maximum thickness of 10 to 15 feet in some areas. Deposits of colluvial materials are found within many of the secondary drainages on the project site.

Landslide Deposits (Qls)

Possible landslide deposits occur in two different categories as defined by the City of San Diego Seismic Safety Study (1983). The first category includes known or highly suspected landslides. The second category includes landslides which are considered to be possible or conjectured. The only known (first category) landslide deposits occur in the northwestern portion of the project site on the Bay Point Formation (see Figure 4H-1). Locations of possible or conjectured landslide deposits and slide-prone areas are mapped

on Figures 4H-1 to 4H-3. These areas occur primarily on the Mission Valley Formation (Tmv) and the Friars Formation (Tf).

Topsoil (unmapped)

In general, the topsoil overlying the Stadium Conglomerate, Scripps Formation, Torrey Sandstone, Lindavista Formation, Bay Point Formation, and terrace deposits is estimated to possess a low expansion potential. Its thickness is estimated to be on the order of two feet. Topsoil overlying the Mission Valley Formation and Friars Formation, however, is estimated to typically possess a higher expansive potential, and its thickness may vary from two to five feet.

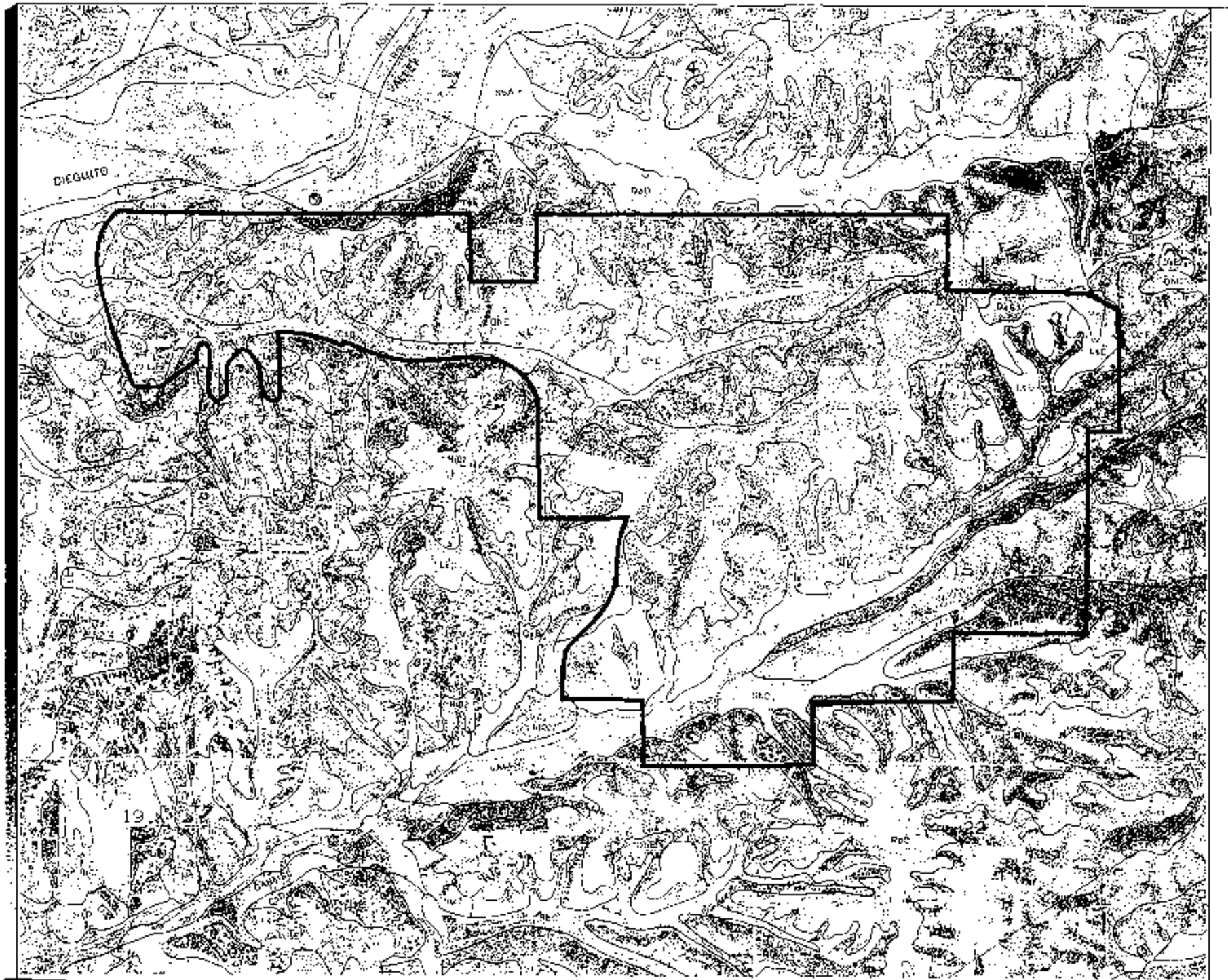
Artificial Fill (Qaf)

Artificial fill on the project site is associated with reservoir berms, unimproved roads, utility alignments, and trash pits left from previous farming practices. Two approximately 25-foot-high earthen dams exist on the site, one in McGonigle Canyon and the other in Deer Canyon. The dam in McGonigle Canyon is breached, while that in Deer Canyon impounds water. The fill material used on-site consists of silty sands and is probably locally derived (Pacific Soil Engineering, Inc. 1989). Several recently constructed detention basins were observed in several of the drainages in the northwestern portion of the site. These temporary structures appear to have been constructed to mitigate erosion during the heavy rains of early 1993 (Converse Consultants West 1993).

b) Soils

The soils present within Pacific Highlands Ranch are illustrated in Figure 4H-4. Table 4H-1 summarizes the erosion and runoff potential of each soil type (U.S. Department of Agriculture 1973). The soil type is generally associated with the changing topography within the site. The majority of the site is comprised of Las Flores loamy fine and Olivenhain cobbly loam, with the Las Flores loamy fine occurring on the mesa areas and the Olivenhain cobbly loam located on the more steeply sloping areas. Corralitos loamy sand occurs primarily in the bottom areas of Gonzales Canyon, while the Salinas clay loam occurs primarily in the bottom areas of McGonigle and Deer Canyons. Other soil types occur interspersed throughout the site.

Soils with the potential for slight to high erosion and slow to rapid runoff exist throughout the subarea. Soils with the potential for expansion and compression also exist on-site. As indicated in the geotechnical reports prepared for the project, these soils would require removal and recompaction in those areas proposed for development.



Soil Legend (on-site only):

CbD	Carlsbad gravelly loamy sand, 9-15% slopes
CnB	Corralitos loamy sand, 0-5% slopes
CnC	Corralitos loamy sand, 5-9% slopes
CnD	Corralitos loamy sand, 9-15% slopes
DaC	Diablo clay, 2-9% slopes
DeE	Diablo-Olivenhain complex, 9-30% slopes
HrC2	Huerhuero loam, 5-9% slopes, eroded
HrD2	Huerhuero loam, 9-15% slopes, eroded
HrE2	Huerhuero loam, 15-30% slopes, eroded
LeC2	Las Flores loamy fine sand, 5-9% slopes, eroded
LeD2	Las Flores loamy fine sand, 9-15% slopes, eroded
LnC	Linne clay loam, 9-15% slopes
LvF3	Loamy alluvial land-Huerhuero complex, 9-50% slopes, severely eroded
OhE	Olivenhain cobbly loam, 9-30% slopes
OhF	Olivenhain cobbly loam, 30-50% slopes
RdC	Redding gravelly loam, 2-9% slopes
RdF	Redding cobbly loam, 15-50% slopes, dissected
SbC	Salinas clay loam, 2-9% slopes
Tcs	Terrace escarpments

FIGURE 4H-4

Soils Map

NORTH

4000' 2000 FEET 0

Source: United States Department of Agriculture 1973

TABLE 4H-1
SOIL CHARACTERISTICS WITHIN SUBAREA III

Soil Type	Runoff Potential	Erosion Hazard
Carlsbad gravelly loamy sand (9-15% slopes)(CbD)	Medium	Moderate
Corralitos loamy sand (0-5% slopes)(CsB)	Slow	Slight
Corralitos loamy sand (5-9% slopes)(CsC)	Slow to medium	Slight to moderate
Corralitos loamy sand (9-15% slopes)(CsD)	Medium	Moderate
Diablo clay (2-9% slopes)(DaC)	Slow to medium	Slight to moderate
Diablo-Olivenhain complex (9-30% slopes)(DoE)	Medium to rapid	Moderate to high
Huerhuero loam, eroded (5-9% slopes)(HrC2)	Slow to medium	Slight to moderate
Huerhuero loam, eroded (9-15% slopes)(HrD2)	Medium	Moderate
Huerhuero loam, eroded (15-30% slopes)(HrE2)	Medium to rapid	Moderate to high
Las Flores loamy fine sand, eroded (5-9% slopes)(LeC2)	Slow to medium	Slight to moderate
Las Flores loamy fine sand, eroded (9-15% slopes)(LeD2)	Medium	Moderate
Linne clay loam (9-30% slopes)(LsE)	Medium to rapid	Moderate to high
Loamy alluvial land-Huerhuero complex, severely eroded (9-50% slopes)(LvF3)	Rapid	Severe
Olivenhain cobbly loam (9-30% slopes)(OhE)	Medium to rapid	Moderate to high
Olivenhain cobbly loam (30-50% slopes)(OhF)	Rapid	High
Redding gravelly loam (2-9% slopes)(RdC)	Slow to medium	Slight to moderate
Redding cobbly loam, dissected (15-50% slopes)(RfF)	Medium to rapid	Moderate to high
Salinas clay loam (2-9% slopes)(SbC)	Slow to medium	Slight to moderate
Terrace escarpments (TeF)	Rapid	High

c) Groundwater

The northern portion of the subarea is located within the San Dieguito Hydrographic Unit, and the southern portion is located within the Peñasquitos Hydrographic Unit. Shallow groundwater conditions are indicated by standing water in Carmel Valley. It is likely that a permanent shallow groundwater table exists within Gonzales, McGonigle, and Deer Canyons. It is also likely that during the rainy season, shallow perched groundwater conditions could develop within alluvial and colluvial deposits in many areas.

Groundwater that occurs in the coastal plains section of the San Dieguito HU generally contains sodium chloride and has a concentration of total dissolved solids that often exceeds 1,000 milligrams per liter. Ratings for groundwater for domestic use in this section of the San Dieguito HU are largely inferior, due to a high TDS and sulfate content. Ratings for irrigation use in this unit are generally inferior because of the high electrical conductivity and a high chloride content. Locally, there are areas where the groundwater is rated suitable.

Groundwater quality in the Peñasquitos HU is generally marginal to inferior for domestic and irrigation purposes. In the coastal part of the Peñasquitos area, groundwater salinities range from 500 to 5,000 mg/l of TDS and usually exhibit a sodium chloride character. The prevailing sodium chloride character of the groundwater found in both the mesas and alluvium-filled valleys can be largely attributed to connate waters. Connate water is the water entrapped in the interstices of a sedimentary rock at the time the rock was deposited.

d) Geologic Hazards

Faulting and Seismicity

A seismic evaluation prepared for Pacific Highlands Ranch by Converse has not identified any known active or potentially active faults on the project site. Pacific Highlands Ranch is not within a currently designated Alquist-Priolo Special Studies Zone. Regional topographic and seismic characteristics are influenced by a series of northwest-trending faults associated with the San Andreas fault system.

As part of this seismic evaluation, an analysis was performed to estimate the magnitude and the peak horizontal ground accelerations (PHGA) at the site for the maximum credible earthquake (MCE) and the maximum probable earthquake (MPE). Seismic sources for the analysis included major regional faults and smaller faults located close to the site. A total of 12 faults or seismic sources were identified within a 62.1-mile radius of the subarea. The results of this analysis are summarized in Table 4H-2.

TABLE 4IR-2
SUMMARY OF SEISMIC SOURCES AND PARAMETERS

Abbreviated Fault Name	Approximate Distance mi. (km)	Maximum Credible Magnitude (Richter scale)	Peak Site Acceleration (g)	Site Intensity (Mercalli scale)	Maximum Probable Magnitude	Peak Site Acceleration (g)	Site Intensity (Mercalli scale)
Rose Canyon	5 (9) - 8 (13)	7.50	0.44 - 0.36	X - IX	6.25	0.31 - 0.24	IX
Coronado Bank/Offshore Zone of Deformation	17 (27) - 19 (31)	7.50	0.22 - 0.20	VIII	6.00	0.09 - 0.08	VII
Elsinore	29 (46)	7.50	0.14	VIII	6.75	0.09	VII
San Clemente	50 (81)	7.50	0.08	VII	6.25	0.03	V
Palos Verde Hills	51 (82)	7.50	0.05	VI	5.50	0.01	III
Coyote Creek (San Jacinto)	52 (83)	7.50	0.07	VI	6.00	0.02	IV
Casa Loma-Clark (San Jacinto)	52 (84)	7.50	0.07	VI	7.00	0.05	VI
Newport-Inglewood	54 (86)	7.50	0.07	VI	6.50	0.03	V
Hot S-Buck Ridge (San Jacinto)	54 (87)	7.50	0.07	VI	6.25	0.02	IV
Whittier-North (Elsinore)	59 (95)	7.50	0.06	VI	6.25	0.02	IV
Glen Helen-Lytle (Claremont)	59 (95)	7.50	0.06	VI	7.00	0.04	V
Borrego Mountain (San Jacinto)	61 (98)	6.50	0.02	IV	6.25	0.02	IV

Table 4H-2 presents distances from the subarea to the faults, MCE, MPE, and expected horizontal bedrock accelerations at the site. The nearest faults are the Rose Canyon fault, located approximately 5 to 8 miles southwest of the subarea, and the Coronado Bank fault, an offshore zone of deformation located approximately 17 to 19 miles west of the subarea. The closest major active fault, the Elsinore fault, is located approximately 29 miles northeast of the subarea. The PHGA range for the Rose Canyon fault's MCE and MPE events are 0.44 *g* (gravity) to 0.39 *g* and 0.31 *g* to 0.24 *g*, respectively. The PHGA for the Elsinore fault's MCE and MPE events are 0.14 *g* and 0.09 *g*, respectively.

In addition to these faults, the State Route 56 West, Carmel Valley Restoration and Enhancement Project Plan Amendments Final EIR identifies a potentially active fault in Carmel Valley approximately 2,000 feet east of the I-5/Carmel Valley Road intersection (City of San Diego 1990).

e) Seismic Safety Study

The City of San Diego Seismic Safety Study (Figure 4H-5) provides hazard categories for areas within the city. The hazard category describes the geologic feature or condition suspected at the site. A relative risk is assigned to each hazard category. Based on relative risk, the level of required geotechnical review for planning and development permits and building permits is determined. The relatively level mesa areas on-site are in hazard category 53: unfavorable geologic structure, low to moderate risk.

The slopes on-site are generally rated as 23, Friars: neutral or favorable geologic structure with a low to moderate risk for slope instability. Areas with a 23 rating are considered to be slide-prone formations. The slide-prone formations are generally located on the steeply sloping areas that extend from the level mesas to the floor of the valleys and tributary canyons. There are four discrete areas on-site with a 22 rating, for possible or conjectured landslides with a moderate risk.

f) Liquefaction

Liquefaction occurs when soils lose all shear strength during an earthquake. The result can be total to differential settlement of structures founded in liquefying soils. A rating of 31 used in the seismic safety study (see Figure 4H-5) is applied to major alluvial valleys that have a groundwater table within 25 feet of the surface. No such conditions exist in or near Pacific Highlands Ranch. The floor of Deer Canyon and McGonigle Canyon have geologic hazard ratings of 32, a relatively low potential for liquefaction because the groundwater table is lower than 25 feet from the surface. Areas rated as 32 consist of minor drainages with fluctuating groundwater.

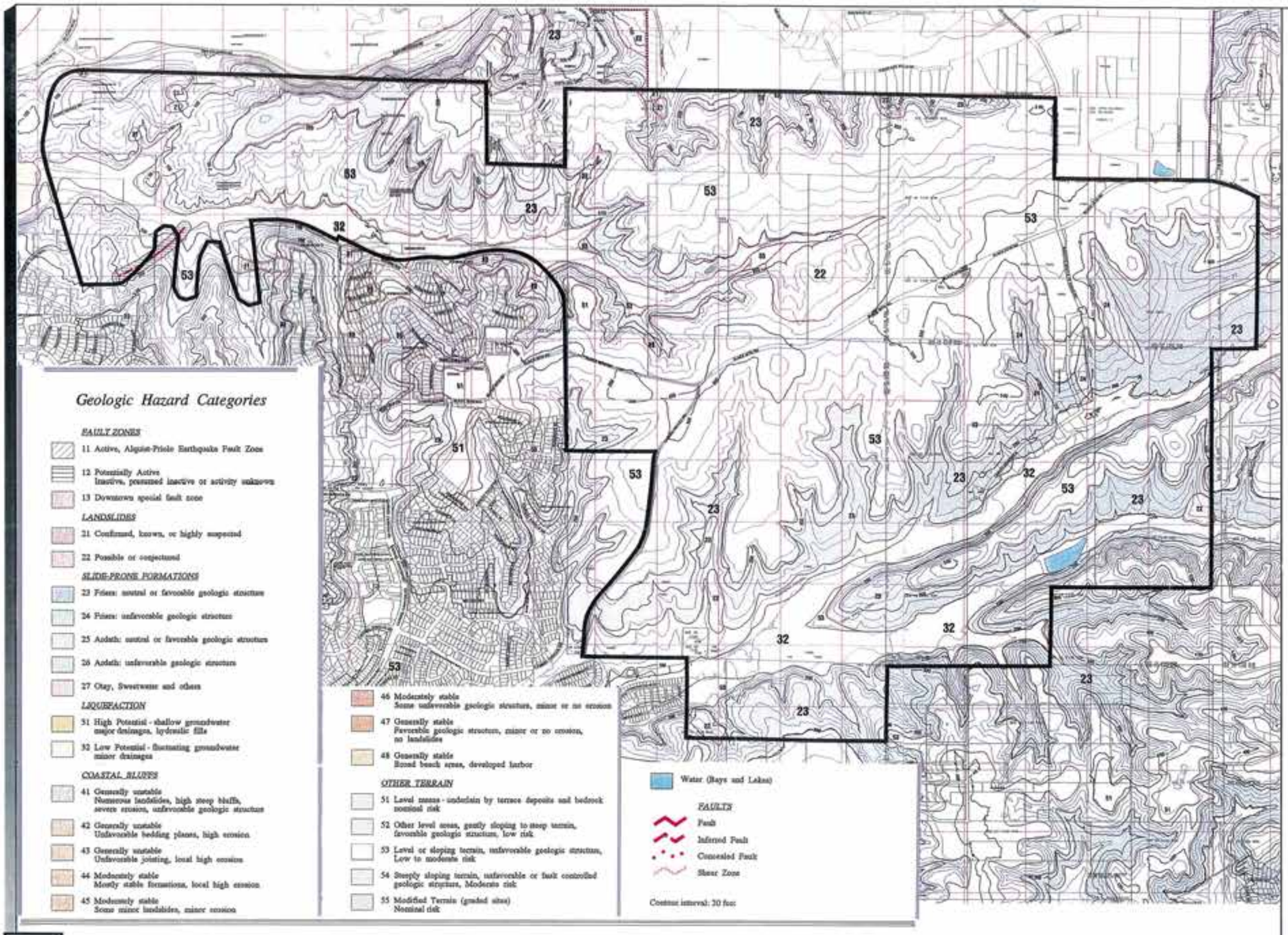


FIGURE 4H-5

Seismic Safety Study Map

Geology/Soils/Erosion Issues

1. Are there geologic or soils conditions in the subarea which would present a constraint to development?

2. Would development of the site increase the potential for erosion?

1) Issue

Are there geologic or soils conditions in the subarea which would present a constraint to development?

Impacts

a) Geologic Formations and Surficial Deposits

Torrey Sandstone (Tt) and Scripps Formation (Tsc)

Since these formations are relatively unstable when exposed in cut slopes, slope stabilization may be required in these areas. The sandstones should be suitable for capping building areas which might otherwise contain expansive soils at grade. Excavations within these formations should be readily accomplished with moderate ripping by conventional earth-moving equipment. The occurrence of localized cemented stones or concretions may be expected; however, the need for blasting is unlikely.

Friars Formation (Tf)

The commonly occurring claystone beds within the Friars Formation generally require slope stabilization measures if exposed in cut slopes or if they lie at shallow depth beneath fill slopes. The clays of the Friars Formation are moderately to highly expansive and will require either selective grading or specially designed foundations. This formation should be rippable with conventional grading equipment.

Stadium Conglomerate (Tst)

Moderately heavy to heavy ripping should be anticipated during grading within this unit. Because of the high cobble content, this formation is generally considered less desirable than sandstones of the Mission Valley Formation or Torrey Sandstone for capping building pads. Cut or fill slopes should possess adequate stability if graded at inclinations of 1.5:1 and 2:1, respectively. The soil matrix of the conglomerate is generally of low expansive potential and should provide adequate bearing capacity for the support of conventional spread footings.

Mission Valley Formation (Tmv)

Cut and fill slopes with inclinations of 2.0 horizontal to 1.0 vertical can be expected to possess adequate overall stability. Excavation should be readily accomplished with moderate ripping and conventional heavy-duty grading equipment. The occurrence of localized cemented zones or concretions is likely, but the need for blasting is considered extremely remote.

Lindavista Formation (Qln)

Moderately heavy to heavy ripping should be anticipated during grading within this unit. Due to the high cobble content, this formation is generally considered to be less desirable for capping building pads than sandstone of the Mission Valley Formation or Torrey Sandstone. Cut or fill slopes should possess adequate stability if graded at inclinations of 1.5:1 and 2:1, respectively. The soil matrix of the conglomerate is generally of a low expansive potential and should provide adequate bearing capacity for the support of conventional spread footings.

Bay Point Formation (Qbp)

This formation may require slope stabilization measures where it is exposed in cut slopes or if it exists at shallow depths beneath fill slopes. This formation should be rippable with conventional grading equipment.

Terrace Deposits (Qt)

Since only limited areas of the project site are covered with terrace deposits, it is likely that they will not be of major consideration during site development.

Alluvium (Qal)

Where structural improvements are proposed in the area of alluvial soils, remedial grading in the form of removal and recompaction would be required. Impacts on alluvial soils are not expected to be significant, as most of the proposed development would take place out of the canyons where alluvial deposits are prevalent.

Colluvium (Qcol)

Removal and recompaction of colluvium would be necessary in areas where structural improvements are proposed. Due to the limited extent of these materials, no impact is expected on the proposed development.

Landslide Deposits (Qls)

The proposed development plan for Pacific Highlands Ranch would avoid construction on known landslide deposits, thereby avoiding potential impacts.

Topsoil (unmapped)

The unconsolidated consistency and expansive potential of the topsoil may require remedial grading, such as removal and recompaction.

Artificial Fill (Qaf)

In general, the fill soils present on the site are not considered suitable to support structural improvements. It is likely that the fill soils would require removal and recompaction in all structural areas. All earthen dams that are planned to remain in use should be evaluated for proper stability and modified as necessary.

b) Groundwater

Where filling of canyons or ravines is planned, subdrains to relieve the potential buildup of hydrostatic pressure would be required. Due to the anticipated installation of municipal water, sewer, and storm drain systems, the proposed development would not have an adverse impact on existing groundwater quality. Usage of groundwater for agricultural and domestic purposes is anticipated to cease upon the installation of a municipal water supply system, and existing groundwater quality problems in the area would, therefore, not impact the proposed project.

c) Geologic Hazards

Ancient Landslides

In order to accurately determine the size and subsurface geometry of erosional remnants of additional slides that were not identified within the Friars Formations, exploratory drilling and/or trenching would be required. Where landslides are present in areas to be developed, earth buttresses or other remedial measures could be provided during site development to properly stabilize the ancient landslide. Similarly, remedial grading may be required where slides are not present but where weak claystone beds are encountered. Slide debris often possesses zones of compressible material and some recompaction of these soils may be necessary.

Liquefaction

The risk of liquefaction adversely affecting site development is extremely low. Liquefaction-prone areas exist mainly in the canyon bottoms, which are designated as open space in the NCFUA Framework Plan.

Faulting and Seismicity

The seismic hazard considered most likely to impact the site is ground shaking due to an earthquake on a major, active, regional fault. Liquefaction resulting from seismic shaking could impact limited areas of the site, as discussed above.

The Rose Canyon fault may be capable of producing a Richter magnitude earthquake greater than 6.0; the Elsinore fault is believed to have a repeat activity interval of approximately 60 years for magnitude 7.3 shaking; and the San Jacinto fault could produce a Richter magnitude of 7.8. Due to their distance from the project site, design engineering of structures and features could provide an adequate margin of safety for seismic events along these faults.

Significance of Impacts

There are no significant soil or geologic conditions that were observed or known to exist on the project site which would preclude development of the property. However, potentially significant geologic conditions exist which require mitigation, including ancient landslides, expansive soils, unstable cut slopes, alluvial soils, poorly consolidated soils, and ground shaking due to an earthquake.

Mitigation, Monitoring, and Reporting

For each specific development application in Pacific Highlands Ranch, the City will require the applicant to submit a detailed geotechnical study by a qualified geotechnical firm. The conclusions and implementation of the recommendations provided in these reports would mitigate the potentially significant effects of soil and geologic conditions for future developments in Pacific Highlands Ranch to below a level of significance. The types of mitigation requirements which the feasibility studies are likely to contain are summarized below.

a) General Measures

1. In areas of proposed development, landslides, improperly compacted fill soil, weak claystone beds, and potentially compressible deposits of alluvium and colluvium may require special attention. Buttresses, stabilizing fill material, or other methods of stabilization will probably be required in developed areas where weak claystone beds or landslides are encountered. In areas where landslides exist off-site, and where stabilization is not feasible, setbacks may be required.

2. The Mission Valley and Friars Formations, and some areas of topsoil, may include highly expansive soil. Based on this review of geologic units on the site, it is anticipated that an adequate quantity of low expansive soil exists on the site to mitigate the adverse impact of expansive soil, when it is encountered.

3. If there are proposed improvements that will be sensitive to potential settlement, partial removal and recompaction of compressible alluvium and colluvium will be necessary.

4. It is anticipated that areas of perched groundwater may exist within low-lying alluvial areas. Subdrains or other remedial measures will be necessary where drainage courses are proposed to be filled.

5. For the purpose of preliminary design, it is recommended that portions of the site that are subject to inundation due to a dam failure upstream be located and considered for restricted usage.

b) Grading

For the purpose of preliminary design, cut and fill slopes shall be designed no steeper than 2:1. The shear strengths of existing soil and rock units will generally limit safe allowable slope height. The potential impact of geologic conditions on slope stability shall be evaluated in areas of proposed high cut slopes.

c) Foundations

The dominant soil conditions on the site are generally suitable for supporting conventional spread footings, if the soil is in a dense and undisturbed condition or in a properly compacted condition. The actual soil characteristics and proposed design parameters for structures on the site will determine minimum footing dimensions and requirements for reinforcement. These factors are not currently known; however, it is estimated at this time that spread footings that are designed in accordance with the Uniform Building Code will be designed for an allowable soil bearing pressure of at least 2,000 pounds per square foot.

d) Drainage and Maintenance

Proper surface drainage shall be provided and maintained, as it is essential to soil stability and to reduce the potential for erosion. Drainage swales shall be installed on graded pads to conduct storm or irrigation runoff to controlled drainage facilities and away from buildings and the tops of slopes. Measures shall be taken to ensure that storm and irrigation water does not flow over the tops of cut or fill slopes.

e) Consultation and Plan Review

A more comprehensive soil and geologic evaluation shall be performed prior to providing final grading plans for the site. This evaluation shall be required to be implemented as a condition of final maps and grading plans. A geotechnical engineer shall also perform an on-site reconnaissance. A report shall be submitted for review and approval to the City's Engineering and Development Department prior to issuing grading permits.

2) Issue

Would development of the site increase the potential for erosion?

Impacts

Results of grading activities that will disrupt soil profiles include an increased exposure to wind and rain, which are erosive forces. Low cohesive sand and other on-site soils have been identified as highly erodible and may be exposed in excavations, especially those within the terrace deposits, the Bay Point Formation, the Torrey Sandstone, and the Mission Valley Formation. Other soil conditions and geologic units on the site are anticipated to have a low potential for erosion. Undisturbed soil and rock conditions are generally expected to have a low potential for erosion.

Significance of Impacts

Future grading activities for the implementation of specific development projects in Pacific Highlands Ranch would result in a potentially significant increase in soil erosion.

Mitigation, Monitoring, and Reporting

Prior to approval of a grading permit, each applicant for a specific development project in Pacific Highlands Ranch shall prepare a grading/construction management plan. The following mitigation measures, in addition to those listed in the Hydrology/Water Quality section of this MEIR (Chapter 4.D), shall be incorporated into the plan, if appropriate. The City's Development Services must approve the grading/construction management plans before a grading permit is issued and grading will commence. The geotechnical engineer shall inspect all cut and fill slopes and foundation work. A landscape architect will observe the revegetation of graded slopes. Each of these experts shall submit a report to the City.

1. Areas that have been stripped of native vegetation or areas of fill material shall require particular attention. These areas may require desilting basins, improved surface drainage, or planting of ground covers early in the improvement process, to reduce the potential for erosion.

2. Short-term measures for controlling erosion shall be incorporated into grading plans for the site. These measures shall include sandbag placement and temporary detention basins, as required by the City's Engineering and Development Department.

3. Catch basins shall be provided during grading activities.

4. Grading activities may be restricted during the rainy season, depending on the size of the specific operation. This season typically encompasses November through March. Grading activities may otherwise be restricted by their proximity to sensitive wildlife habitat.

5. After grading, slopes shall be immediately revegetated or hydroseeded with erosion-resistant species. These plants should be carefully irrigated to ensure coverage of the slopes prior to the next rainy season.

6. Measures to control construction sediment shall be implemented in areas near watercourses. These measures may include interim desiltation basins, sandbags, hay bales, or silt fences, which shall be placed at the toe of slopes to prevent erosion. Punch straw or matting shall be installed to stabilize graded slopes and prevent the slope or construction material from sloughing into watercourses.

I. Natural Resources

Existing Conditions

Evaluations of agricultural resource potential are based on two data sources: historical use of the area for agricultural purposes and analyses of project area soil qualities.

a) Agricultural Resources

Pacific Highlands Ranch Agriculture

As stated in the Framework Plan EIR, agricultural production in Pacific Highlands Ranch has a lengthy history but is not regionally significant. A brief summary begins with the McGonigle family, who started farming in the Carmel Valley area in the 1860s. By 1872 (San Diego County Map), two sons were farming in McGonigle Canyon. Aerial photographs taken in 1928 show farming activities in the western half of McGonigle as well as Gonzales Canyon. City of San Diego agricultural land use maps from the 1950s show field crops in Pacific Highlands Ranch. Much of the farming was on hills adjoining Gonzales Canyon and in the north-central portion of the area. Two small areas (5-10 acres each) of vegetables and orchards are also shown in Carmel Valley. By 1958, field crops were still located in Carmel Valley, McGonigle Canyon, and the western end of Deer Canyon. A 1966 map shows an overall decrease in agricultural activity, although crops were still present in McGonigle and Deer Canyons, the Carmel Valley area, and north of McGonigle Canyon.

Agricultural pursuits in Pacific Highlands Ranch overall are diminishing. The largest crop producer in Pacific Highlands Ranch (Mr. Okegawa) has been leasing the property since 1985. Although he has increased usage dramatically over prior farming interests (the former producer grew nonirrigated beans), there has been an estimated 40 to 50 percent reduction in his farming efforts due to market conditions and competition from Mexico. Crops grown regularly include tomatoes, cucumbers, green beans, squash, sweet corn, bell pepper, celery, and strawberries. Although his crop ratio changes from year to year based on anticipated demand, tomatoes are generally the largest crop.

Prime Farmland in Pacific Highlands Ranch (as defined by the State of California on its Important Farmlands Map) is limited to approximately 136 acres in McGonigle and Deer Canyons (Figure 4I-1). Figure 4I-1 also shows the locations of the other agricultural categories in the subarea. Subarea agricultural endeavors are primarily located on Farmlands of Local Importance and Unique Farmlands.

As shown on Figure 4I-1, most of Pacific Highlands Ranch contains Farmlands of Statewide Importance, Unique Farmland or Farmlands of Local Importance. The

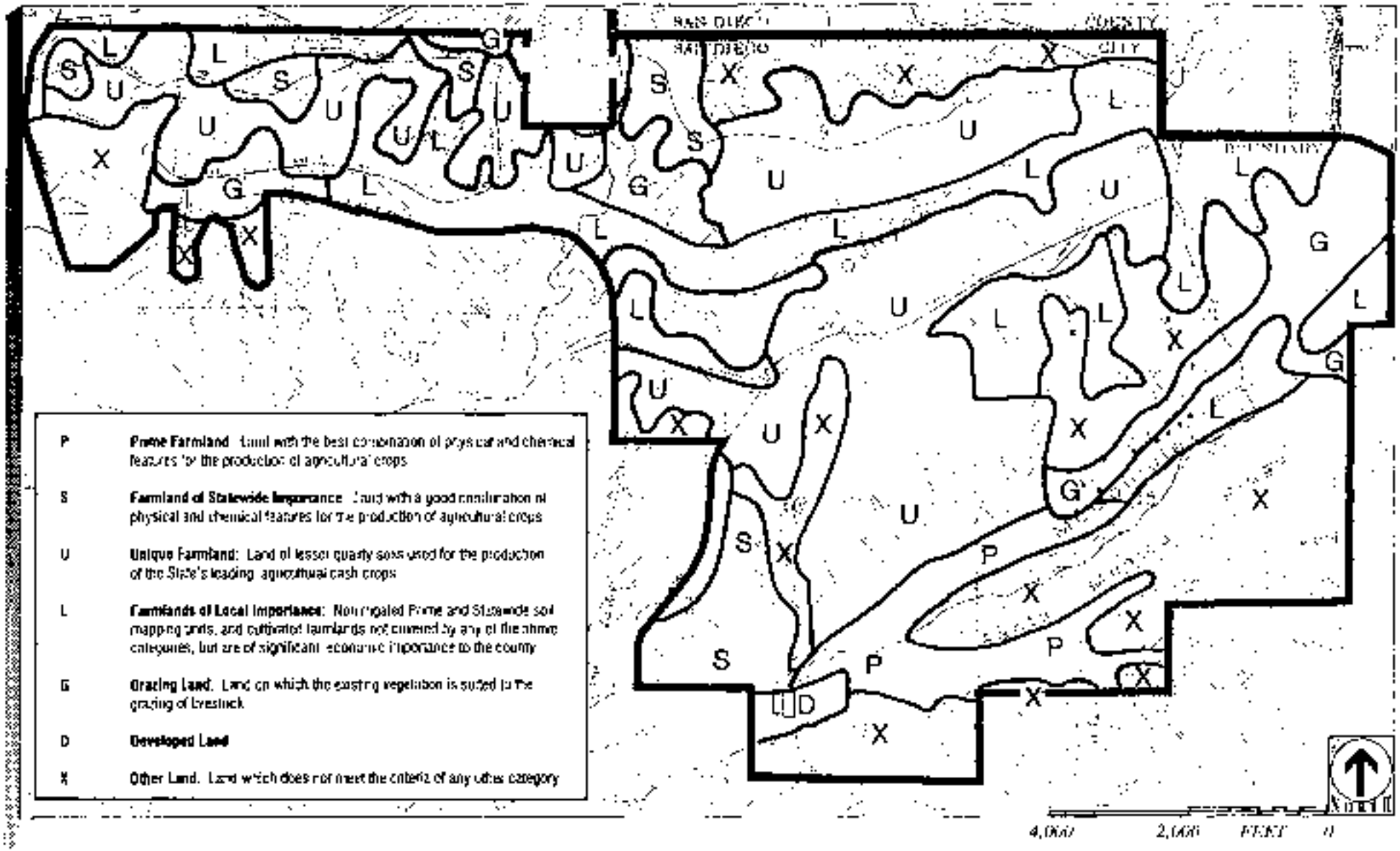


FIGURE 41-1

Important Farmlands

remainder of the subarea is identified on the map as grazing land or lands which do not meet any important farmland category. A recent aerial photograph of the site (see Figure 2-4) shows that about one-half (1,320 acres) of the subarea has been under cultivation in recent years. Much of this is actually fallow field, or at least acreage previously in agriculture. Currently, 500 acres are used on an annual basis for crop production. Most of the field crops in the subarea are located south of Gonzales Canyon, in an area classified by the state as unique or of local or statewide importance. Additional farming is taking place on the ridge between the western reaches of McGonigle and Deer Canyons and in a north/south-trending strip extending from Black Mountain Road southerly toward Carmel Valley. These areas are not classified on Figure 4I-1 as having any special farmland importance. The largest of agricultural areas, producing ornamentals, is located north and south of Del Mar Heights Road and north of Black Mountain Road. Smaller tree and sod nurseries are located between Black Mountain Road and Gonzales Canyon just west of the residential development along Caminito Mendiola.

Pacific Highlands Ranch Soils

In Soil Survey, San Diego Area, Part III (USDA 1973), soils of the region have been rated for suitability for five specific intensely grown crops by two crop suitability interpretations. These are the Storie Index and Capability Group (Table 4I-1). The Storie Index expresses numerically the relative degree of suitability, or value of a soil for general intensive agriculture. Profile characteristics, soil surface texture, slope, and other miscellaneous conditions are assigned percentages, with the most agriculturally favored condition rated as 100 percent. These percentage factors are multiplied together to achieve the final Storie Index rating. Soils in the San Diego region range from a low of about 5 to a high of 97.

The Capability Group classifies soils according to their limitations when cultivated and according to the way they respond to management practices. Soils are grouped in eight classes, from Class I through VIII, with Class I being the least restricted.

The on-site soils are described above in Chapter 4.H, Geology and Soils (see Figure 4H-2 and Table 4H-1).

There are no Class I soils within Pacific Highlands Ranch. Class II soils, however, account for 225 acres (8 percent) and are located in Deer and McGonigle Canyons. Class III soils are more severely limited and may require both increased selectivity of cropping programs and conservation practices. Approximately 161 acres (6 percent) of the project area, primarily associated with Gonzales Canyon, are defined as having Class III soils. Class IV soils require careful management practices, but farming of row, grain, and tree crops is still possible. Approximately 890 acres (34 percent) of the site is defined as having Class IV soils and are, in fact, the areas where the majority of agricultural activity

TABLE 41-1
ACREAGE, CAPABILITY CLASSIFICATION, AND STORIE INDEX
OF SUBAREA III SOIL TYPES

Soil	Soil Name	Capability Classification	Acreage	Storie Index	Weighted Storie Index
CbD	Cieneba gravelly loamy sand, 9-15% slopes	IVe-8	7	20	0.05
CsB	Corralitos loamy sand, 0-5% slopes	IIIs-4	157	64	3.79
CsC	Corralitos loamy sand, 5-9% slopes	IIIs-4	4	61	0.09
CsD	Corralitos loamy sand, 9-15% slopes	IVs-4	5	52	0.10
DaC	Diablo clay, 2-9% slopes	IIe-5	19	42	0.30
DoE	Diablo-Olivenhain complex, 9-30% slopes	IVe-5 (Diablo) VIe-7 (Olivenhain)	2	23	0.02
HrC2	Huerhuero loam, 5-9% slopes, eroded	IVe-3	231	38	3.31
HrD2	Huerhuero loam, 9-15% slopes, eroded	IVe-3	62	36	0.84
HrE2	Huerhuero loam, 15-30% slopes, eroded	VIe-3	54	32	0.65
LeC2	Las Flores loamy fine sand, 5-9% slopes, eroded	IVe-3	459	31	5.37
LeD2	Las Flores loamy fine sand, 9-15% slopes, eroded	IVe-3	68	29	0.74
LnE	Linne clay loam, 9-30% slopes	IVe-1	57	14	0.30
LvF3	Loamy alluvial land-Huerhuero complex, 9-50% slopes, severely eroded	VIIIs-1	173	23	1.50
OhE	Olivenhain cobbly loam, 9-30% slopes	VIe-7	681	20	5.14
OhF	Olivenhain cobbly loam, 30-50% slopes	VIIe-7	132	10	0.50
RdC	Redding gravelly loam, 2-9% slopes	VIe-3	7	19	0.05
RdF	Redding cobbly loam, 15-50% slopes, dissected	VIIe-7	65	10	0.25
SbC	Salinas clay loam, 2-9% slopes	IIe-1	206	73	5.67
TeF	Terrace escarpments	VIIIe-1	261	< 10	0.98

is currently taking place. Approximately 52 percent of the soils on-site are classified in classes below Class IV and are not suitable for cultivation of coastal crops; their uses are mainly restricted to pasture, range, or recreational uses.

The best Pacific Highlands Ranch soils under the Storie Index system have a rating between 60 and 80 and account for approximately 14 percent of project area soils. Soils with this rating are suitable for most crops and have few special management needs. Approximately 1 percent of the soils have a rating between 40 and 60 and are suited to crops which require special management. Sixty-six percent of Pacific Highlands Ranch soils have a rating between 20 and 40, indicating that usage for crop is severely limited. Nineteen percent of the soils on-site have Storie Index ratings of less than 20, indicating unsuitability for any crops.

In addition, the Soil Survey (USDA 1973) classifies an area as being "agricultural land" if the soils have a fair or good suitability rating for at least one of the specified crops. As Table 4I-2 illustrates, almost all the soils found on the site are rated as fair to good for at least one of the crops. For those soils with no ratings at all, no data were provided as to their crop suitability.

Prime Farmland Definitions

The viability of a particular piece of land to support agriculture is based on a number of factors, including climate, growing season, topography, water availability, and soils. Since most land will support some form of agriculture, it is important to further refine the agricultural land definition to include only "prime agricultural land." "Conversion of prime agricultural land to non-agricultural use of impairment of the agricultural productivity of prime agricultural land" is one example cited in CEQA as an environmental "consequence which may be deemed to be significant" (State Administrative Code, Section 15064).

Prime agricultural land has been defined in the California Government Code, Section 51201. This definition is also included in the Williamson Act, which is California State legislation allowing the creation of agricultural preserves, and has been incorporated into the Local Agency Formation Commission (LAFCO) guidelines governing agricultural land proposed for annexation to incorporated cities. Prime agricultural land, as defined by the act, includes land, whether a single parcel or contiguous parcels, which has not been developed for a use other than an agricultural use and meets any of the following qualifications:

1. All land which qualifies for a rating as Class I or II on the Soil Conservation Service Land Use Capability classifications.

2. Land which qualifies for a rating of 80 to 100 on the Storie Index.

TABLE 41-2
CROP SUITABILITY

Soil	Soil Name	Avocado	Citrus	Truck Crops	Tomatoes	Flowers
CbD	Carlsbad gravelly loamy sand, 9-15% slopes	NR	Fair	NR	NR	Fair
CsB	Corralitos loamy sand, 0-5% slopes	Good	Good	Good	NR	Good
CsC	Corralitos loamy sand, 5-9% slopes	Good	Good	Fair	NR	Good
CsD	Corralitos loamy sand, 9-15% slopes	Good	Good	NR	NR	Fair
DaC	Diablo clay, 2-9% slopes	NR	NR	NR	Good	NR
DoE	Diablo-Olivenhain complex, 9-30% slopes	--	--	--	--	--
HrC2	Huerhuero loam, 5-9% slopes, eroded	NR	NR	Fair	Good	Fair
HrD2	Huerhuero loam, 9-15% slopes, eroded	NR	NR	NR	Fair	Fair
HrE2	Huerhuero loam, 15-30% slopes, eroded	--	--	--	--	--
LaC2	Las Flores loamy fine sand, 5-9% slopes, eroded	NR	NR	Fair	NR	Good
LaD2	Las Flores loamy fine sand, 9-15% slopes, eroded	NR	NR	NR	NR	Fair
LxE	Linne clay loam, 9-30% slopes	--	--	--	--	--
LvF3	Loamy alluvial land-Huerhuero complex, 9-50% slopes, severely eroded	--	--	--	--	--
OhE	Olivenhain cobbly loam, 9-30% slopes	NR	Fair	NR	NR	NR
OhF	Olivenhain cobbly loam, 30-50% slopes	--	--	--	--	--
RdC	Redding gravelly loam, 2-9% slopes	--	--	--	--	--
RtF	Redding cobbly loam, 15-50% slopes, dissected	--	--	--	--	--
SbC	Salinas clay loam, 2-9% slopes	NR	Fair	Fair	Good	Fair
TeF	Terrace escarpments	--	--	--	--	--

NR = not rated

3. Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre, as defined by the U.S. Department of Agriculture (USDA).

4. Land planted with fruit- or nut-bearing trees, vines, bushes, or crops that have a nonbearing period of less than five years and which will normally return, during the commercial bearing period on an annual basis, from the production of unprocessed agricultural plant production, not less than two hundred dollars ($200.00) per acre.

5. Land which has returned from the production of unprocessed agricultural plant products at an annual gross value of not less than two hundred dollars ($200.00) per acre for three of the previous five years.

In addition to designating agricultural preserves, the Williamson Act allows landowners to enter a contractual agreement with the federal government protecting the land from taxation increases in return for its continued use for agriculture. Williamson Act preserves and contract lands are noted on County Tax Assessor maps. Current assessor's maps show no agricultural preserves or contract lands within Pacific Highlands Ranch.

Other categories are recognized as well: Farmlands of Statewide Importance, which are lands with similar characteristics to Prime Farmlands but with minor limitations such as slopes or less ability to hold and store moisture; Unique Farmlands, which include lesser-quality soils used in the production of leading cash crops or dry-farmed prime or statewide important farmlands; Farmlands of Local Importance, which are lands of importance to the local agricultural economy; and Grazing Lands, which are suitable for the grazing of livestock.

b) Mineral Resources

The following discussion focuses on the regional significance of aggregate resources which are actively mined in San Diego County. No other mineral resources of value are expected to be found within the project site area.

Aggregate consists of sand, gravel, and crushed rock. Aggregate is considered a mineral commodity and provides bulk and strength for a multitude of uses in metropolitan areas, especially in development areas where new construction is common. Sand and crushed rock are used as aggregate in portland cement concrete (PCC) and asphaltic concrete. Blocks of granite rock are quarried for decorative rock, monuments, and surface plaster. Large irregular blocks of stone are quarried for use as riprap. Decomposed granite is taken from pits for use as a base under road pavements and cold-mixed asphaltic pavement.

Aggregate materials are classified as either reserves or resources. Reserves are defined by the California Department of Mines and Geology (CDMG) as the "aggregate material believed to be acceptable for commercial use, that exist within property boundaries owned or leased by an aggregate producing company, and for which permission allowing extraction and processing has been granted by the proper authorities" (California Department of Conservation 1982). Aggregate resources include "reserves as well as all similar potentially usable aggregate materials that can be economically mined in the future, but for which no use permit allowing extraction has been granted."

The scarcest aggregate deposits in San Diego County are those which are suitable for use as PCC aggregate. The materials specifications for PCC aggregate are more restrictive than for other aggregate types. As a result, fewer deposits satisfy these specifications.

In accordance with classification guidelines established by the State Mining and Geology Board and in compliance with the Surface Mining and Recovery Act of 1975, the state geologist is required to classify areas into Mineral Resources Zones (MRZs). These zones are established on the basis of an aggregate resource appraisal which includes an analysis of geologic reports and maps, field investigations, an examination of active sand and gravel mining operations, analyses of drill hole data, interpretation of aerial photographs, and evaluation of private company data. The guidelines for establishing the MRZ are as follows:

- MRZ-1. Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.

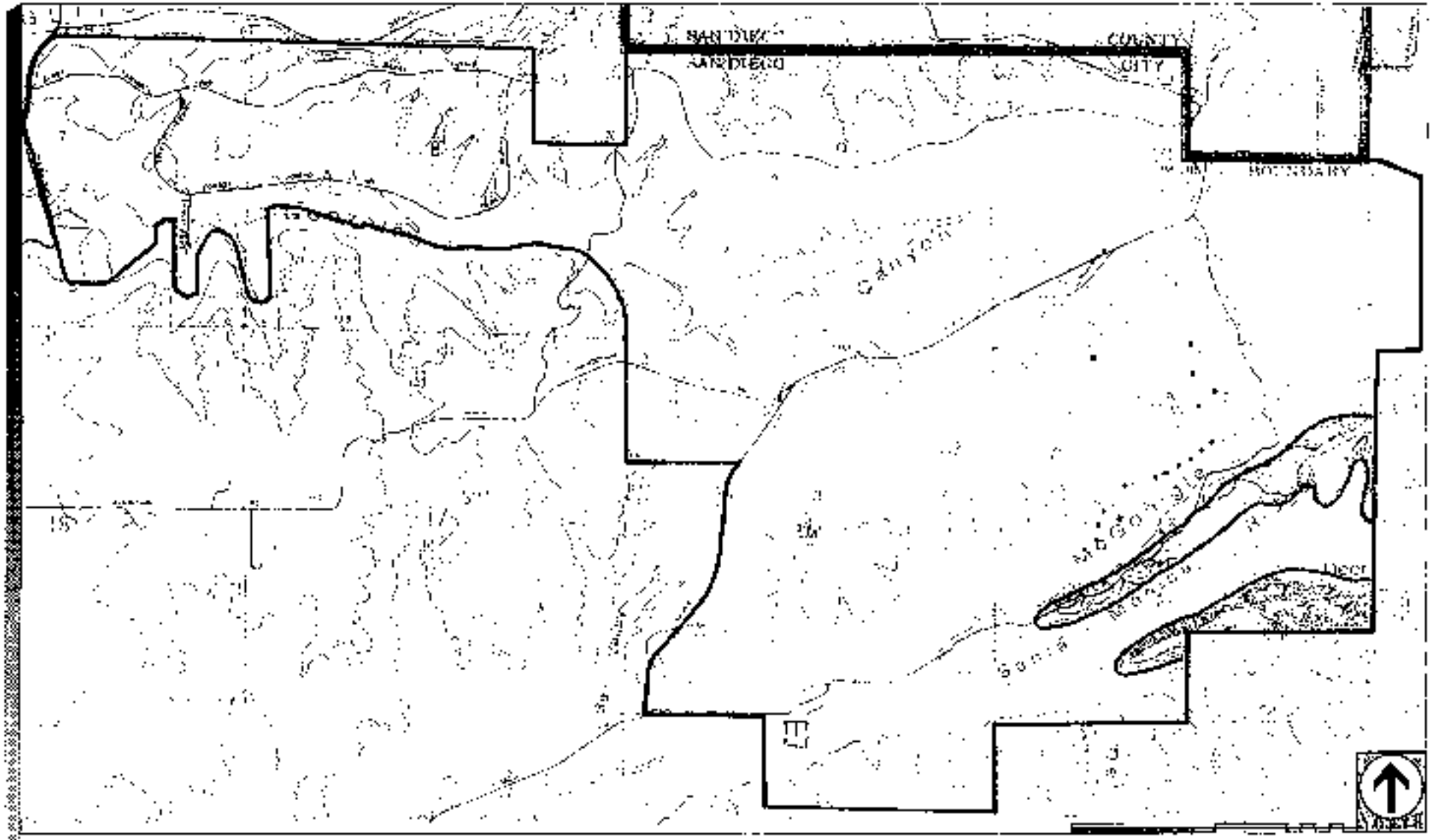
- MRZ-2. Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists.

- MRZ-3. Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

- MRZ-4. Areas where available information is inadequate for assignment to any other MRZ.

Classification of mineral deposits in western San Diego County was compiled in the California Division of Mines and Geology Special Report 153 (California Department of Conservation 1982). These areas were then considered for designation as MRZs. The project site lies within the western San Diego County Production Consumption Region (P-C Region), as identified in CDMG Special Report 153.

This report has not designated any areas as MRZ-1 or MRZ-4 within Pacific Highlands Ranch. Virtually the entire subarea is designated MRZ-3 except for approximately 116 acres designated as MRZ-2 (Figure 4I-2). Areas classified as MRZ-3 are those



Source: Calif. Department of Conservation, Division of Mines and Geology, 1982

Adequate information indicates that significant mineral deposits are present or it is judged that a high likelihood for their presence exists

Areas containing mineral deposits whose significance cannot be evaluated from available data.

FIGURE 41-2

Mineral Resource Zones

containing mineral deposits, the significance of which cannot be evaluated from available data.

The MRZ-3 deposits within Pacific Highlands Ranch which are most likely to have an economic importance are the alluvial deposits located in Gonzales, McGonigle, and Deer Canyons.

The MRZ-2 land in Pacific Highlands Ranch is mapped on the Stadium Conglomerate formation along Santa Monica Ridge in the southeast and on the ridge south of Deer Canyon (see Figure 4I-2). These MRZ-2 areas are part of a larger MRZ-2 area designated as Sector J(5) of the Kearny Mesa–Mission Valley Resource Area (California Department of Conservation 1982). Sector J of the Kearny Mesa–Mission Valley Resource Area encompasses about 34,961 acres of Eocene conglomerate which is of commercial value for aggregate.

Aggregate producers in Sector J must blend the coarse aggregate with sand from other deposits or crushed coarse material to make PCC aggregate. Without extensive processing, only the coarse fraction of the conglomerate deposits can be used in PCC aggregate. Consequently, most of the remaining finer material is discarded, giving a waste factor of up to 40 percent. Thickness of the deposits vary from a few tens of feet along the west margin, in the vicinity of Pacific Highlands Ranch, to over 500 feet in the eastern area of the sector. A resource of 5,810 million tons underlines Sector J, almost all (5,780 million tons) consisting of coarse aggregate.

The conservation element of the County of San Diego General Plan identifies the region of the county with the largest quantity of aggregate deposits and the greatest market for construction-quality aggregate as the metropolitan market area, which is the area located south of the San Dieguito River and west of the Laguna Mountains (County of San Diego 1990). In western San Diego County there are a minimum of 21 aggregate resource areas suitable for the extraction of sand, gravel, and rock.

According to CDMG Report 153, the western San Diego County P-C Region is facing a 330-million-ton deficit of aggregate to supply the entire region through the year 2030. Based on a total projected PCC aggregate demand of 360 million tons and assuming that all PCC quality material will be used only for PCC aggregate material, there is an anticipated 60-million-ton deficit of PCC aggregate through 2030.

Natural Resources

1. Would implementation of the Pacific Highlands Ranch Plan result in the conversion of agricultural land to nonagricultural uses or impairment of existing agricultural productivity?

2. Would implementation of the project result in the prevention of future extraction of sand and gravel and/or mineral resources?

1) Issue

Would implementation of the Pacific Highlands Ranch Plan result in the conversion of agricultural land to nonagricultural uses or impairment of existing agricultural productivity?

Impacts

Subarea Plans 1 and 2. Implementation of the proposed Pacific Highlands Ranch Plans would change the predominant existing land use in Pacific Highlands Ranch from agriculture to residential, commercial, and MSCP open space. The loss of farmland due to development and the preservation of open space for habitat protection associated with the MSCP open space preserve would preclude farming on approximately 136 acres of Prime Farmland in McGonigle and Deer Canyons. Open space preservation would also preclude farming on Farmlands of Local Importance and Grazing Land located in the upper reaches of Gonzales Canyon.

Significance of Impacts

As described in the NCFUA Framework Plan EIR, the direct impacts to prime agricultural resources on the project site from open space preservation and development are considered significant. The incremental loss of land being used for agriculture is also considered a significant cumulative impact and is identified as such in Chapter 6 of this MEIR.

Mitigation, Monitoring, and Reporting

Only implementation of the No Project alternative would reduce the identified agricultural resources impact associated with potential future development to below a level of significance.

2) Issue

Would implementation of the project result in the prevention of future extraction of sand and gravel and/or mineral resources?

Impacts

There are no existing mining operations within Pacific Highlands Ranch which would be replaced during implementation of the Pacific Highlands Ranch Plan.

The majority of Pacific Highlands Ranch is designated an MRZ-3 zone. Therefore, development of the project would not result in significant natural resources impacts in those areas.

However, there are approximately 116 acres of designated MRZ-2 zone lands in the southeast corner of the subarea. As indicated above, these deposits are identified as a source of PCC aggregate. The MRZ-2 project areas, which include Santa Monica Ridge and the ridgeline south of Deer Canyon, are proposed as open space within the MSCP areas of the project. This would preclude mineral extraction, which is considered an incompatible use within the MSCP.

Significance of Impacts

The loss of the potential for recovery of mineral resources from mineral resource zones classified by the State as significant (MRZ-2) has the potential to be a significant, long-term impact. However, there is no history of mining activity in Pacific Highlands Ranch and no known sensitive mineral resources in Pacific Highlands Ranch would be excavated and removed or covered with development as part of plan implementation. Rather, they would be retained in perpetuity as open space areas. Therefore, no potentially significant direct impacts are anticipated. However, the potential exists for significant cumulative impacts.

Mitigation, Monitoring, and Reporting

No mitigation of direct impacts would be required. Only the No Project alternative would avoid potential cumulative significant natural resource impacts.

J. Paleontological Resources

The potential for paleontological resources within Pacific Highlands Ranch was determined using the geologic formations map (see Figure 4H-1) and a review of published geologic reports, new field data collected since 1979 by the San Diego Natural History Museum and paleontological locality maps as presented by Deméré and Walsh (1994). This report is used by the City of San Diego to determine the potential for fossil remains within given geologic formations and the respective sensitivity of those fossil remains.

Existing Conditions

Paleontology is defined as a science dealing with the life of past geologic periods as known from fossil remains. Paleontological resources (fossils) are the remains and/or traces of prehistoric animal and plant life exclusive of human remains or artifacts. Fossil remains such as bones, teeth, shells, leaves, and so on, are found in the geologic deposits (rock formations) within which they were originally buried. Fossil remains are important as they provide indicators of the Earth's chronology and history. They represent a limited, nonrenewable, and sensitive scientific and educational resource.

The potential for fossil remains at a given location can be predicted through previous correlations that have been established between the fossil occurrence and the geologic formations within which they are entombed. Geologic formations possess a specific paleontological resource potential wherever the formation occurs based on discoveries made elsewhere in that particular formation.

To evaluate paleontological resources in Pacific Highlands Ranch, the presence and distribution of geologic formations and the respective potential for paleontological resources were reviewed. The following is a summary of the research conducted for the project site and associated conclusions for paleontological resource potential.

The project site is located within the Coastal Plain Province, which is underlain by a "layer cake" sequence of marine and nonmarine sedimentary rock units that record portions of the last 140 million years of earth history. Over this period of time the relationship of land and sea has fluctuated drastically such that today we have ancient marine rocks preserved up to elevations around 900 feet above sea level and ancient river deposits as high as 1,200 feet. Sedimentary rocks of the Late Cretaceous, Eocene, Pliocene, Pleistocene, and Holocene age underlie the general vicinity of the project area.

Although few fossil remains have been found in the project area because of a lack of intense development, mammal, molluscan, calcareous nannoplankton, flora, and

foraminifera from the formations similar to those within the subarea have been collected generally west of I-5 and south of Carroll Canyon Road and Sorrento Valley Road.

Additionally, the City has identified at least six sites containing paleontological resources either within or adjacent to the NCFUA (NCFUA Plan EIR). These sites are listed on Table 4J-1; relevant maps are on file with the City's Development Services Business Center. These sites have been typically encountered during grading/excavation for specific projects.

TABLE 4J-1
KNOWN PALEONTOLOGICAL SITES WITHIN OR ADJACENT TO THE NCFUA

Site No.	General Location	Formation or Deposit
2853, 2987	Outside of NCFUA, mouth of Carmel Valley	Boundary of alluvial deposits and outcropping of Bay Point Formation
3170	Just north of Los Peñasquitos Canyon, at about elevation 180 feet	Santiago Peak Volcanics
3269	Outside NCFUA, just north of Del Mar Heights Road and just east of El Camino Real	Friars Formation
3282	Just south of NCFUA, between Del Mar Heights Road and Gonzales Canyon	Mission Valley Formation
3284	Outside of NCFUA, in Carmel Valley, north and east of intersection with Shaw Valley	Alluvial deposits

SOURCES: City of San Diego Development Services Business Center, "Areas within the City of San Diego Which Have Paleontological Significance."

Additionally, there are a number of formations within Pacific Highlands Ranch that have the potential to contain significant paleontological resources. These include five Eocene sedimentary formations—Torrey Sandstone, Scripps Formation, Friars Formation, Stadium Conglomerate, and Mission Valley Formation—and five Quaternary units—Lindavista Formation, Bay Point Formation, river terrace deposits, alluvium, and colluvium. Each of these formations has been evaluated for its paleontological resource potential and given a rating from high to low sensitivity (Table 4J-2) based on the following criteria (PaleoServices 1991).

- **High Sensitivity** - These formations contain a large number of known fossil localities. Generally speaking, highly sensitive formations produce vertebrate fossil remains or are considered to have the potential to produce such remains.

- **Moderate Sensitivity** - These formations have a moderate number of known fossil localities. Generally speaking, moderately sensitive formations produce invertebrate fossil remains in high abundance or vertebrate fossil remains in low abundance.

- **Low and/or Unknown Sensitivity** - These formations contain only a small number of known fossil localities and typically produce invertebrate fossil remains in low abundance. Unknown sensitivity is assigned to formations from which there are presently no known paleontological resources but which have the potential for producing such remains based on their sedimentary origin.

- **Very Low Sensitivity** - Very low sensitivity is assigned to geologic formations that, based on their relative youthful age and/or high-energy depositional history, are judged to be unlikely to produce any fossil remains.

The paleontological resource potential for each formation identified within Pacific Highlands Ranch is taken from Demeré and Walsh (1994) and is discussed below.

a) Torrey Sandstone (Tt)

The Torrey Sandstone consists primarily of yellowish white, coarse-grained, locally cross-bedded, arkosic sandstones. The Torrey Sandstone has produced important remains of fossil plants and marine invertebrates. The plant remains (mostly leaves) are especially significant because many are from taxa that would suggest that the Eocene climate in this area was warmer and wetter than the modern climate. Invertebrate fossils known from the Torrey Sandstone primarily consist of nearshore marine taxa (e.g., clams, oysters, snails, and barnacles). Vertebrate fossil remains are rare and include teeth of crocodiles, sharks, and rays.

The coarse-grained nature of the Torrey Sandstone and the generally poor state of preservation of contained fossils supports a moderate paleontological resource sensitivity rank.

Torrey Sandstone occurs primarily in the westernmost portion of the subarea on the slopes along Gonzales Canyon. A small area of Torrey Sandstone also occurs on the southwestern corner of the subarea.

TABLE 4J-2
PALEONTOLOGICAL RESOURCES POTENTIAL

Geologic Formation	Paleontological Resources Sensitivity Rank
Torrey Sandstone (Tt)	Moderate
Scripps Formation (Tsc)	High
Friars Formation (Tf)	High
Stadium Conglomerate (Tst)	High
Mission Valley Formation (Tmv)	High
Lindavista (Qln)	Moderate
Bay Point Formation (Qbp)	High
Terrace Deposits (Qt)	Low
Alluvium (Qal)	Low
Colluvium (Qcol)	High

b) Scripps Formation (Tsc)

The Scripps Formation consists of interbedded layers of claystones, siltstones, and sandstones, with some cobble conglomerate. The Scripps Formation is considered to be potentially fossiliferous almost everywhere it occurs. Most of the fossils known from this formation consist of remains of marine organisms including clams, snails, crabs, sharks, rays, and bony fishes. However, remains of fossil reptiles (e.g., crocodile and turtle) and land mammals (e.g., uintathere, brontothere, rhinoceros, and artiodactyl) have also been recovered from the formation. Well-preserved pieces of fossil wood have also been recovered from the Scripps Formation.

Based on the joint occurrence of marine invertebrate fossils and terrestrial vertebrates, the Scripps Formation is assigned a high paleontological sensitivity. There is only a small outcropping of Scripps Formation in the extreme southwestern corner of the subarea.

c) Friars Formation (Tf)

The Friars Formation is the uppermost (i.e., youngest) formation in the La Jolla Group. The Friars Formation consists mainly of light gray, medium-grained sandstones; greenish, reddish, and brown siltstones and mudstones; and common lenses of cobble conglomerate. The Friars Formation is rich in vertebrate fossils, especially terrestrial mammals such as opossums, insectivores, primates, rodents, artiodactyls, and perissodactyls. Also reported from the Friars Formation are well-preserved remains of marine microfossils and macroinvertebrates. Remains of fossil leaves have also been recovered from the Friars Formation.

Based on the recovery of diverse and well-preserved fossil assemblages of both marine invertebrates and terrestrial vertebrates, the Friars Formation is assigned a high paleontological resource sensitivity. The Friars Formation occurs throughout the subarea on the slopes surrounding Deer, McGonigle, Gonzales, and La Zanja Canyons.

d) Stadium Conglomerate (Tst)

The Stadium Conglomerate is the lowermost formation of the Poway Group. The lower member of the Stadium Conglomerate, which occurs on-site, is composed of light green-gray, poorly sorted cobble conglomerate with a muddy to sandy matrix. In Mission Valley, sparse marine fossil remains occur near the base of the lower member of the Stadium Conglomerate. Exposures of the lower member at Scripps Ranch are primarily nonmarine and have produced well-preserved remains of land mammals including opossums, insectivores, primates, rodents, carnivores, and artiodactyls. The majority of the fossils recovered from the lower member were found in either claystone rip-up clasts or in the sandy matrix characteristic of certain channel-fill deposits in this rock unit.

The lower member of the Stadium Conglomerate has produced moderately diverse assemblages of terrestrial mammals and is assigned a high paleontological resource sensitivity. Stadium Conglomerate occurs near the tops of the mesas in the central and northern portions of the subarea and on the tops of Santa Monica Ridge and the ridge separating McGonigle and Deer Canyons.

e) Mission Valley Formation (Tmv)

The Mission Valley Formation consists of light gray, fine-grained marine sandstones. The marine strata of the Mission Valley Formation have produced abundant and generally well-preserved remains of marine microfossils (e.g., foraminifers), macroinvertebrates (e.g., clams, snails, crustaceans, and sea urchins), and vertebrates (e.g., sharks, rays, and bony fish).

Fluvial strata of the Mission Valley Formation have produced well-preserved examples of petrified wood and fairly large and diverse assemblages of fossil land mammals including opossums, insectivores, bats, primates, rodents, artiodactyls, and perissodactyls. The co-occurrence in the Mission Valley Formation of land mammal assemblages with assemblages of marine microfossils, mollusks, and vertebrates is extremely important as it allows for the direct correlation of terrestrial and marine faunal time scales.

The Mission Valley Formation represents one of the few instances in North America where such comparisons are possible. The Mission Valley Formation has produced diverse fossil assemblages of both marine invertebrates and terrestrial vertebrates and is assigned a high paleontological resource sensitivity. The Mission Valley Formation occurs extensively throughout the central and northern portions of Pacific Highlands Ranch. This is the predominant formation found on-site.

f) Lindavista Formation (Qln)

The Lindavista Formation represents a marine or nonmarine terrace deposit of early Pleistocene age (approximately 0.5-1.5 million years ago). Typical exposures of the formation consist of rust red, coarse-grained, pebbly sandstones and pebble conglomerates with locally common deposits of green claystone. Fossil localities are rare in the Lindavista Formation (e.g., Tierrasanta and Mira Mesa). Fossils collected from these sites consist of remains of nearshore marine invertebrates including clams, scallops, snails, barnacles, and sand dollars, as well as sparse remains of sharks and baleen whales.

Based on the scarcity of fossils (primarily marine invertebrates) reported from this rock unit, the Lindavista Formation is assigned a moderate paleontological resource sensitivity. Pockets of Lindavista Formation occur primarily along the northern boundary of Pacific Highlands Ranch, with some occurrences south of Deer Canyon.

g) Bay Point Formation (Qbp)

The Bay Point Formation is a nearshore marine sedimentary deposit of late Pleistocene age (approximately 220,000 year old). Typical exposures consist of light gray, friable to partially cemented, fine- to coarse-grained, massive and cross-bedded sandstones. The Bay Point Formation has produced large and diverse assemblages of well-preserved marine invertebrate fossils, primarily mollusks. However, remains of fossil marine vertebrates (i.e., sharks, rays, and bony fishes) have also been recovered from this rock unit.

Based upon the occurrence of extremely diverse and well-preserved assemblages of marine invertebrate fossils and rare vertebrate fossils in the Bay Point Formation, it is assigned a high resource sensitivity. The Bay Point Formation only occurs in the extreme northwest portion of Pacific Highlands Ranch.

h) Terrace Deposits (Qt)

Deposits of coarse-grained, gravelly sandstones, pebble and cobble conglomerates, and claystones occur along the margins of many of the larger coastal valleys. Fossils have been collected from river terrace deposits at several location in coastal San Diego County. These locations include the south side of Sweetwater Valley, where fluvial sandstones and siltstones have produced well-preserved remains of pond turtle, passenger pigeon, hawk, mole, gopher, squirrel, rabbit, and horse; the South Bay Freeway (SR-54), where fluvial siltstones have yielded a diverse assemblage of "Ice Age" mammals (ground sloth, shrew, mole, mice, wolf, camel, deer, horse, mastodon, and mammoth); and San Dieguito Valley (in Fairbanks Highlands, just north of Pacific Highlands Ranch), where fluvial sandstones have produced well-preserved remains of ground sloth. All of these important sites have been discovered in construction-related excavations.

The general coarse-grained nature of these deposits coupled with the paucity of known fossil occurrences might suggest a low paleontological resource sensitivity. However, the fact that important vertebrate remains have been collected from several sites indicates that potentially significant sites may be encountered elsewhere, and thus, a moderate resource sensitivity is assigned. Terrace deposits occur within Pacific Highlands Ranch along the northern side of Gonzales Canyon and near the mouth of McGonigle Canyon.

i) Alluvium (Qal)

Flooring the modern drainages are poorly consolidated alluvial sediments of relatively recent age (i.e., younger than 10,000 years old). Lithologies consist of poorly consolidated clays, silts, sands, and gravel. Fossils are generally unknown from the later Quaternary alluvial deposits in the Coastal Plain Province. There are three notable exceptions. Teeth and limb bones of a mammoth were found in floodplain deposits of the Tijuana River valley, a single mammoth tusk was found in alluvial deposits in the

southwestern portion of El Cajon Valley, and a mammoth femur was recovered from alluvial deposits in the Santa Margarita River channel at the south end of the Camp Pendleton Marine Corps Base.

Because of their young age, later Quaternary alluvial deposits in San Diego County are assigned a low paleontological resource sensitivity. Alluvial deposits within Pacific Highlands Ranch occur in the bottoms of Gonzales, McGonigle, and Deer Canyons.

j) Colluvium (Qcol)

Colluvial materials located within Pacific Highlands Ranch consist of silty sands to sandy clays with cobble-sized rock fragments and have an estimated maximum thickness of 10 to 15 feet in some areas. Deposits of colluvial materials are found within many of the secondary drainages on the project site. The resource potential for colluvial deposits is assumed to be the same as the formations from which the deposits originated and therefore have the same designations.

Paleontological Resources Issue

1. To what extent would implementation of the Pacific Highlands Ranch Plan result in the loss of paleontological resources?

1) Issue

To what extent would implementation of the Pacific Highlands Ranch Plan result in the loss of paleontological resources?

Impacts

Impacts to paleontological resources occur when earthwork activities cut into geological formations within which fossils are located and result in the physical destruction of the fossils. The limitations of field surveys to identify impacts prevent a precise determination of the potential for significant fossil finds in the project area prior to grading. In general, however, there is a high potential for such finds in large portions of the project site.

The majority of the development is proposed for the mesa tops north of McGonigle Canyon. These areas primarily consist of Mission Valley Formation deposits which have a high potential for paleontological resources. Additionally, as discussed above, all other formations on-site with the exception of the alluvial deposits are assigned a moderate to

high potential for paleontological resources. Therefore, implementation of the Pacific Highlands Ranch Plan has the potential to expose paleontological formations.

Significance of Impacts

The potential for significant fossils to occur in the formations of the subarea plan is moderate to high in all areas planned for development of the Pacific Highlands Ranch Plan; therefore, the grading necessary to implement the subarea plan could result in significant impacts to paleontological resources.

Mitigation, Monitoring, and Reporting

The Pacific Highlands Ranch Plan would require that all future tentative maps and VTMs approved include a condition for the implementation of a monitoring and salvage program for the recovery of paleontological resources during development. This program would reduce potential impacts to paleontological resources to below a level of significance and shall include the following steps:

a. Prior to any grading activities and/or the issuance of permits, the applicant shall provide a letter of verification to the Environmental Review Manager of the Land Development Review Division (LDR) stating that a qualified paleontologist and/or paleontological monitor have been retained to implement the paleontological monitoring program. The requirement for monitoring shall be noted on grading plans. All persons involved in the paleontological monitoring of grading activities shall be approved by LDR.

b. The qualified paleontologist or paleontological monitor shall attend any preconstruction/pregrading meetings to consult with the excavation contractor.

c. The paleontologist of paleontological monitor shall be on-site full time during excavation into previously undisturbed formations. The monitoring time may be decreased at the discretion of the paleontologist in consultation with LDR, depending on the rate of excavation, the materials excavated, and the abundance of fossils.

d. If fossils are encountered, the paleontologist shall have the authority to divert or temporarily halt construction activities in the area of discovery to allow recovery of fossil remains. The paleontologist shall contact LDR at the time of discovery. LDR shall concur with the salvaging methods before construction activities are allowed to resume.

e. The qualified paleontologist shall be responsible for preparation of fossils to a point of identification as defined in the City of San Diego Paleontological Guidelines, and

submittal of a letter of acceptance from a local qualified curation facility. The paleontologist shall record any discovered fossil sites at the San Diego Natural History Museum.

f. The qualified paleontologist shall be responsible for the preparation of a monitoring results report with appropriate graphics summarizing the results (even if negative), analyses, and conclusions of the above program. The report shall be submitted to LDR prior to the issuance of building permits and/or certificates of occupancy. If building plans are not required, the paleontologist shall submit the report to LDR within three months following the termination of the monitoring program.

Prior to subarea plan approval, the Development Services Business Center shall verify that the above mitigation measures are incorporated in appropriate sections of the subarea plan. These measures shall be conditions of subsequent tentative maps and VTMs and development proposals.

K. Noise

The discussion below is based on the noise technical report prepared for the proposed Pacific Highlands Ranch Plan. This report can be found in Appendix E of this MEIR. Existing and future noise predictions for the subarea plan were based on the traffic information contained in the traffic technical report which can be found in Appendix B of this MEIR.

Existing Conditions

Existing land uses on-site include nursery operations, commercial agriculture, large lot single-family residences, and horse ranches with associated equestrian activities. The nursery operations are mainly located along Black Mountain Road and grow flowers, palms, and other plants for landscaping purposes. The main agricultural commodity in the project area is pole tomatoes.

Most of the tomato farming takes place on the upland mesas north of Gonzales Canyon. Equestrian activities take place on two horse ranches located on the western end of Gonzales Canyon and in the southeastern corner of the project area. There are 10 existing single-family residences within the project area as well as the 29-unit Rancho Glen Estates subdivision located along Caminito Mendiola in the eastern portion of the site. Most of the remaining area in the southeastern end of the site is currently undeveloped open space.

A north-south San Diego Gas & Electric (SDG&E) power line easement containing a high-power overhead electrical distribution line extends along the eastern boundary. Also, a main water line and two trunk sewer lines traverse the site. The remaining on-site acreage includes roads and open space, much of which is in a disturbed condition.

The CNEL is a 24-hour A-weighted decibel average sound level [dB(A) L_{eq}] from midnight to midnight obtained after the addition of 5 dB to sound levels occurring between 7:00 P.M. and 10:00 P.M. and 10 dB to the sound levels occurring between 10:00 P.M. and 7:00 A.M. A-weighting is a frequency correction that often correlates well with the subjective response of humans to noise. The 5 dB and 10 dB penalties added to the evening and nighttime hours account for the added sensitivity of humans to noise during these time periods.

Currently, the most heavily traveled roadways within the subarea are Black Mountain Road and Carmel Valley Road with an average daily traffic volume of approximately 3,000 trips on each. Current estimated noise levels along these roadways are

approximately 60 CNEL at 50 feet from the roadway centerlines. Noise levels along the other roadways within the subarea are lower.

Away from the roadways, existing noise levels are low in accordance with the rural nature of the area.

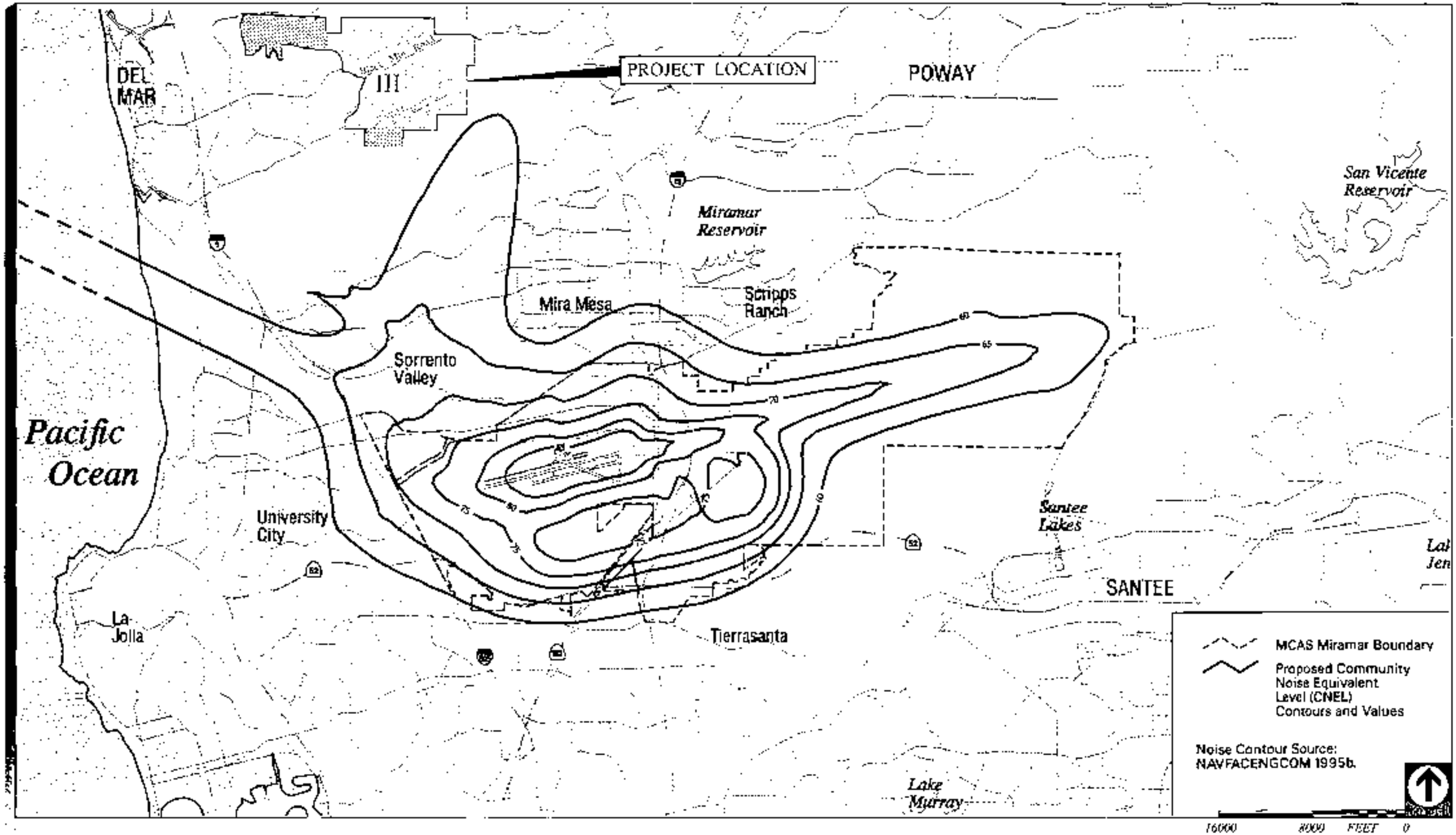
Marine Corps Air Station (MCAS) Miramar lies approximately seven miles to the southwest of the project site. Currently, aircraft from MCAS Miramar operate in the vicinity of the project. Fixed-wing aircraft (e.g., F/A-18s) departing from the base using the Julian Departure Corridor pass along the eastern boundary of the Pacific Highlands Ranch plan area. In the near future, rotary-wing aircraft (helicopters) arriving within the Racetrack Corridor will pass directly over the Pacific Highlands Ranch plan area.

The Comprehensive Land Use Plan originally developed for the base indicates that currently the Pacific Highlands Ranch plan area lies just outside the 60 CNEL contour (SANDAG 1992). The Final Environmental Impact Statement (EIS) for the realignment of the base from Naval Air Station (NAS) Miramar to MCAS Miramar also indicates that the project site currently lies outside the 60 CNEL contour (Ogden Environmental & Energy Services 1996).

The Final EIS for the base realignment indicates that once the transfer of the base to the Marine Corps has been completed, future aircraft operations will result in a slight shift in the 60 CNEL noise contour to the northeast in the vicinity of the project site (Ogden Environmental & Energy Services 1996). Therefore, although the 60 CNEL contour will shift somewhat closer to the project's southeastern boundary with the realignment of NAS Miramar to MCAS Miramar, it is anticipated that noise impacts to the Pacific Highlands Ranch plan area will remain outside of the 60 CNEL noise exposure levels, well below the City's exterior standard of 65 CNEL for residential land uses (Figure 4K-1).

Although helicopters passing over and near the Pacific Highlands Ranch plan area will not violate City noise standards, they do have the potential of being perceived as "nuisance noise" for intermittent periods of time by some residents. The severity of the nuisance noise is generally a subjective response for each individual affected.

The Miramar EIS indicates an average of five helicopter operations per day over the Pacific Highlands Ranch plan area utilizing the Racetrack Corridor. Helicopters will be flying at 4,000 feet MSL or above on arrivals. Therefore, although the helicopters are not anticipated to violate the applicable noise standards, they could be perceived as a nuisance by some residents within the Pacific Highlands Ranch project. These impacts may be more evident for residents in the higher elevations of the project than those at the lower elevations.



Source: United States Marine Corps 1995

FIGURE 4K-1

Relation of Proposed Project to Proposed Noise Contours at MCAS Miramar

Additionally, approximately 83 F/A-18 operations will depart the base utilizing the Julian Departure Corridor. These aircraft departures will be most noticeable to residents in the eastern portion of the site. Therefore, it is advised that all future homeowners be advised using a disclosure statement such as the following:

The development (within Subarea III) is located within the Racetrack Corridor and near the Julian Departure Corridor used by fixed-wing aircraft departing from Marine Corps Air Station (MCAS) Miramar. While this development is considered compatible with these air operations, occupants will occasionally experience varying degrees of noise and vibration. Miramar normally operates between 7:00 A.M. and Midnight Monday through Thursday, 7:00 A.M. to 6:00 P.M. Friday, and 8:00 A.M. until 6:00 P.M. on weekends and holidays. However, as a master jet base, MCAS Miramar may operate 24 hours per day, seven days per week. Therefore, on occasions operations may be on a 24-hour basis.

Noise Issues

1. Would existing or future noise levels resulting from the proposed project adversely impact sensitive noise receptors in and around the project area?

1) Issue

Would existing or future noise levels resulting from the proposed project adversely impact sensitive noise receptors in and around the project area?

Impact

The General Plan of the City of San Diego establishes exterior noise standards in maximum CNELs. For residential areas, schools, libraries, and park sites, the standard is 65 CNEL. Additionally, the City's exterior noise level standard for professional and office buildings is 70 CNEL. The exterior noise level standard for commercial retail, wholesale, shopping centers, industrial manufacturing, and so on is 75 CNEL. However, there are no exterior noise standards for commercial land uses by zoning designation.

Typically, exterior usable areas are considered backyards and recreational areas in residential developments, and outdoor dining and passive recreational areas in commercial/industrial developments. Often these areas can be shielded from noise by locating buildings between those areas and the noise source. However, at this level of planning exterior usable areas cannot be determined. Therefore, the potential for significant noise impacts is evaluated based on the proximity of proposed land uses to the circulation element roadways.

The City of San Diego assumes that standard construction techniques will provide a 15-decibel reduction of exterior noise levels to an interior receiver. With these criteria, standard construction could be assumed to result in interior noise levels of 45 CNEL when exterior sources are 60 CNEL or less. When exterior noise levels are greater than 60 CNEL, consideration of specific construction techniques is required.

The noise analyses, based on future projected ADT, were conducted in accordance with the City's Acoustical Report Guidelines.

The Federal Highway Administration (FHWA) Noise Prediction Model (FHWA 1979), with California Vehicle Noise Emission (Calveno) Levels (California Department of Transportation 1983), was used to estimate existing and future traffic noise in the Pacific Highlands Ranch plan area. The FHWA model takes into account traffic mix, speed, and volume; roadway gradient; relative distances between sources, barriers, and receivers; and shielding provided by intervening terrain or structures.

Due to the limited grading detail available at this level of project planning, the analysis of the future noise environment considered a worst-case condition to identify potential noise impact areas. For this condition, topography was considered flat with no intervening terrain between proposed sensitive land uses and the roadways. Additionally, hard-site conditions were assumed. Hard sites have an attenuation of 3 dB for every doubling of distance from a line source, such as a roadway.

The improved roads which currently exist on-site are Black Mountain Road, which essentially runs the entire east-west length of the southern portion of the site, Carmel Valley Road, Rancho Santa Fe Farms Road, and Caminito Mendiola. The existing western segment of SR-56 currently terminates at Carmel Valley Road in the southwestern corner of the site.

Existing traffic volumes for these roadways were obtained from the traffic report prepared for the proposed project and from SANDAG (Urban Systems Associates 1997; SANDAG 1997a). Both Black Mountain Road and Carmel Valley Road currently carry approximately 3,000 ADT on-site. Rancho Santa Fe Farms Road carries approximately 2,000 ADT and Caminito Mendiola carries less than 1,000 ADT.

On-site Black Mountain Road east of existing Carmel Valley Road will be renamed Carmel Valley Road and is proposed as a four-lane Major throughout the project site. Additionally, the on-site portion of Black Mountain Road west of Carmel Valley Road will be renamed Del Mar Heights Road and improved to a six-lane Prime. Rancho Santa Fe Farms Road will be improved, but will remain a two-lane Collector. No roadway improvements are proposed for Caminito Mendiola.

Only two new circulation element roads will be built on-site. The first is Camino Santa Fe which is proposed as a six-lane Major between Del Mar Heights Road and SR-56, and as a four-lane Major south of SR-56. The other roadway is SR-56. The ultimate configuration of SR-56 through the project site is as a six-lane freeway composed of three mixed-flow lanes each direction. As indicated previously, there are two proposed alignments for SR-56 through the site which are considered in this analysis.

Future average daily traffic volumes for the major roadways on and near the project site were obtained from the traffic report prepared for the project. Table 4K-1 shows these future buildout ADTs which are the volumes projected to occur upon buildout of the region and represent a worst-case scenario for the two interchange SR-56 alignment "F" scenario. Table 4K-2 shows this information for the three interchange SR-56 alignment "F" scenario, while Table 4K-3 shows this information for the SR-56 alignment "D" scenario. The resulting traffic-generated noise levels are relatively insensitive to changes in the traffic volume. For example, a 25-percent increase in traffic volume would only result in a 1-decibel increase in noise levels.

Traffic speed, mixes, and daytime/evening/night distributions used in the analysis are also listed in Tables 4K-1, 4K-2, and 4K-3. Traffic speeds were based on the minimum design speeds for the roadways obtained from the City's Street Design Standards. Posted speeds are normally 5-10 miles per hour (mph) less than the minimum design speed. Additionally, according to the traffic report prepared for the project, all on-site roadways are expected to operate at level of service C or better (Urban Systems Associates 1997). Therefore, conservative speeds of 5 mph less than the minimum design speeds were chosen for the circulation element roadways.

The traffic mix used in the model for all roadways except for SR-56, Caminito Santa Fe south of SR-56 (alignment "F" - three interchange scenario), and the Third Interchange Road south of SR-56 was based on the mix for truck routes used in the City of Carlsbad (City of Carlsbad 1993). The traffic mix used for Camino Santa Fe (alignment "D" and alignment "F" - two interchange option) and the Third Interchange Road south of SR-56 was based on the mix for nontruck routes used in the City of Carlsbad. These mixes were developed through field surveys of routes in Carlsbad, the nearest city from which this detailed information is available.

Since SR-56 is currently under construction, detailed truck mix data is not available for this roadway. Therefore, the mix for SR-56 was based on the percentages of trucks recorded in 1995 on SR-52 south of the project site (California Department of Transportation 1996). SR-52 is the nearest east/west-trending freeway for which this information is available.

The traffic day/evening/night distribution for the major roadways was assumed to be 77 percent daytime, 10 percent evening, and 13 percent nighttime, except for those roadways

TABLE 4K-1
FUTURE TRAFFIC PARAMETERS—ALIGNMENT "F" ALTERNATIVE

Roadway	Segment	Volume (ADT)	Classification	Speed (mph)	Mix*	Distribution†
SR-56	Carmel Country Road/Camino Santa Fe	102,300	Freeway	65	96.7-2.2-1.1	77-10-13
SR-56	Camino Santa Fe/Camino Ruiz	90,600	Freeway	65	96.7-2.2-1.1	77-10-13
Camino Santa Fe	Del Mar Heights Road to SR-56	19,900	6 Lane Major	50	95.3-3.5-1.2	77-10-13
Camino Santa Fe	South of SR-56	6,600	4 Lane Major	50	97.9-1.8-0.3	77-15-8
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	26,000	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	19,600	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Del Mar Heights Road	Lansdale East to Camino Santa Fe	19,600	6 Lane Prime	55	95.3-3.5-1.2	77-10-13

*xx-xx-xx = percent autos-medium trucks-heavy trucks

†xx-xx-xx = percent ADT traveling during the daytime-evening-nighttime hours

TABLE 4K-2
FUTURE TRAFFIC PARAMETERS—ALIGNMENT "F" ALTERNATIVE

Roadway	Segment	Volume (ADT)	Classification	Speed (mph)	Mix*	Distribution†
SR-56	Carmel Country Road/Camino Santa Fe	92,800	Freeway	65	96.7-2.2-1.1	77-10-13
SR-56	Camino Santa Fe/Third Interchange	89,000	Freeway	65	96.7-2.2-1.1	77-10-13
SR-56	Third Interchange/Camino Ruiz	84,100	Freeway	65	96.7-2.2-1.1	77-10-13
Camino Santa Fe	Del Mar Heights Road to SR-56	23,000	6 Lane Major	50	95.3-3.5-1.2	77-10-13
Camino Santa Fe	South of SR-56	6,300	4 Lane Major	50	97.9-1.8-0.3	77-15-8
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	16,300	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	23,100	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Del Mar Heights Road	Lansdale East to Camino Santa Fe	23,600	6 Lane Prime	55	95.3-3.5-1.2	77-10-13
Third Interchange Road	Carmel Valley Road/SR-56	19,900	4 Lane Major	50	95.3-3.5-1.2	77-10-13

*xx-xx-xx = percent autos-medium trucks-heavy trucks

†xx-xx-xx = percent ADT traveling during the daytime-evening-nighttime hours

TABLE 4K-3
FUTURE TRAFFIC PARAMETERS—ALIGNMENT "D"

Roadway	Segment	Volume (ADT)	Classification	Speed (mph)	Mix*	Distribution†
SR-56	Carmel Country Road/Camino Santa Fe	95,000	Freeway	65	96.7-2.2-1.1	77-10-13
SR-56	Camino Santa Fe/Camino Ruiz	90,100	Freeway	65	96.7-2.2-1.1	77-10-13
Camino Santa Fe	Del Mar Heights Road to SR-56	24,500	6 Lane Major	50	95.3-3.5-1.2	77-10-13
Camino Santa Fe	South of SR-56	25,700	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	20,200	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	21,000	4 Lane Major	50	95.3-3.5-1.2	77-10-13
Del Mar Heights Road	Lansdale East to Camino Santa Fe	20,400	6 Lane Prime	55	95.3-3.5-1.2	77-10-13

*xx-xx-xx = percent autos-medium trucks-heavy trucks

†xx-xx-xx = percent ADT traveling during the daytime-evening-nighttime hours

which carry small daily volumes and are expected to only serve small residential areas. For those roadways, the traffic distribution was assumed to be 77 percent daytime, 15 percent evening, and 8 percent nighttime.

As indicated previously, due to the limited grading detail available at this level of planning, the analysis presented here represents worst-case, flat site conditions. The distances to the various noise contours from each roadway for the different Pacific Highlands Ranch plans are shown in Tables 4K-4, 4K-5, and 4K-6. As seen from these tables, without intervening topography, structures, or mitigation, noise generated by traffic on SR-56 would impact the majority of the site, with the 65 CNEL contour lying between approximately 2,500 and 3,000 feet from the freeway. However, intervening topography and future structures will limit this distance.

For the other major roadways within the project site, the 65 CNEL contour would range from approximately 300 to 400 feet from the centerline of the roadway. Except for land uses immediately adjacent to SR-56, noise levels are not anticipated to exceed 75 CNEL, with the 70 CNEL noise contour lying between approximately 100 and 130 feet from the centerlines of the major roadways.

Significance of Impacts

As indicated, noise levels are anticipated to exceed applicable standards for all residential uses immediately adjacent to SR-56 and the major roadways, as well as to proposed school and park uses. Noise levels could exceed 70 CNEL for professional and office building land uses depending on their placement relative to the roadways. Noise levels for commercial retail land uses are not expected to be exceeded unless they are located immediately adjacent to SR-56. Where noise levels exceed applicable exterior standards, noise impacts would be significant.

Mitigation, Monitoring, and Reporting

Mitigation of noise levels could be accomplished through the construction of noise barriers. However, due to the limited grading detail available at this stage of planning, it is not possible to determine specific barrier heights and locations.

The draft EIR prepared by the City for the middle section of SR-56 indicates that wall heights varying between 12 and 16 feet would be required to mitigate noise levels at existing residential uses (City of San Diego 1996b). Similar wall heights would be anticipated for future sensitive uses located along the SR-56 right-of-way within Pacific Highlands Ranch.

TABLE 4K-4
DISTANCE TO NOISE CONTOURS—ALIGNMENT "F" ALTERNATIVE

Roadway	Segment	Distance from Centerline to Contour (feet)*				
		80 CNEL	75 CNEL	70 CNEL	65 CNEL	60 CNEL
SR-56	Carmel Country Road/Camino Santa Fe	95	300	950	3,000	9,490
SR-56	Camino Santa Fe/Camino Ruiz	85	265	840	2,660	8,410
Camino Santa Fe	Del Mar Heights Road to SR-56	--	--	100	320	1,010
Camino Santa Fe	South of SR-56	--	--	--	75	240
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	--	--	130	420	1,320
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	--	--	100	315	995
Del Mar Heights Road	Lansdale East to Camino Santa Fe	--	--	100	315	995

*Distances less than 50 feet are not shown

TABLE 4K-5
DISTANCE TO NOISE CONTOURS - ALIGNMENT "F" ALTERNATIVE

Roadway	Segment	Distance from Centerline to Contour (feet)*				
		80 CNEL	75 CNEL	70 CNEL	65 CNEL	60 CNEL
SR-56	Carmel Country Road/Camino Santa Fe	85	270	860	2,720	8,610
SR-56	Camino Santa Fe/Third Interchange	85	260	825	2,610	8,260
SR-56	Third Interchange/Camino Ruiz	80	245	780	2,470	7,810
Camino Santa Fe	Del Mar Heights Road to SR-56	--	--	115	370	1,170
Camino Santa Fe	South of SR-56	--	--	--	75	230
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	--	--	85	260	830
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	--	--	115	370	1,175
Del Mar Heights Road	Lansdale East to Camino Santa Fe	--	--	120	380	1,200
Third Interchange Road	Carmel Valley Road/SR-56	--	--	100	320	1,010

*Distances less than 50 feet are not shown

TABLE 4K-6
DISTANCE TO NOISE CONTOURS—ALIGNMENT "D"

Roadway	Segment	Distance from Centerline to Contour (feet)*				
		80 CNEL	75 CNEL	70 CNEL	65 CNEL	60 CNEL
SR-56	Carmel Country Road/Camino Santa Fe	90	280	880	2,790	8,820
SR-56	Camino Santa Fe/Camino Ruiz	85	265	835	2,640	8,360
Camino Santa Fe	Del Mar Heights Road to SR-56	--		125	395	1,240
Camino Santa Fe	South of SR-56	--	--	130	410	1,310
Carmel Valley Road	Del Mar Heights Road/Rancho Santa Fe Farms Road	--	--	105	325	1,030
Carmel Valley Road	Rancho Santa Fe Farms Road/Camino Ruiz	--	--	105	335	1,070
Del Mar Heights Road	Lansdale East to Camino Santa Fe	--	--	105	330	1,040

*Distances less than 50 feet are not shown

As a general rule of thumb, a barrier provides five decibels of attenuation when it just breaks the line-of-sight between the source and receiver, and adds one decibel of attenuation for each foot above the height required to break the line-of-sight. Therefore, it is anticipated that noise barriers varying from five to eight feet will be required along the other major roadways within Pacific Highlands Ranch where the roadways are located adjacent to sensitive land uses.

At the time that detailed grading plans are available for the future subdivisions within Pacific Highlands Ranch, detailed acoustical analyses shall be performed to determine the exact barrier heights and locations where required. If exterior noise levels within residential areas are found to be above 60 CNEL after mitigation, then detailed interior noise analyses shall be required as well.

L. Public Services/Facilities

Existing Conditions

a) Elementary, Middle, and High Schools

The project site is located within the jurisdiction of the Solana Beach Elementary School District (ESD), the San Dieguito Union High School District (HSD), and the Del Mar Union ESD. School facilities operated by the Solana Beach ESD are not be expected to serve project-generated children as they are located too far from the proposed project (at least 3.5 miles).

The project site is currently within the attendance boundaries of Del Mar Heights Elementary School located at 13555 Boquita Drive and Del Mar Hills Elementary School located at 14805 Mango Drive, both in the city of San Diego. However, reconfigured school attendance boundaries will be determined as a new school in Carmel Valley Neighborhood 4 will open in September 1998.

Earl Warren Junior High School, the junior high school expected to serve the project, is located at 155 Stevens Avenue in Solana Beach, approximately three miles northwest of the project site. Two other junior high schools (Diegueño and Oak Crest) are also part of the San Dieguito Union HSD but are located in Encinitas, approximately five miles northwest of the project site.

Torrey Pines High School, which currently serves the project vicinity, is located approximately 0.75 mile south of the site, at 3710 Del Mar Heights Road. Two special schools are also part of the San Dieguito Union HSD. These schools, Sunset Continuation and North Coast, are responsive to students with special educational or timing needs (e.g., students who work during normal schools hours or are involved in full-time athletic or arts programs). Both are located at 675 Requeza in Encinitas (approximately 8.5 miles northwest of the site). Although these schools are geographically removed from the site, special needs students from the proposed project could enroll at one of these two schools.

Table 4L-1 provides a summary of the enrollment status of existing schools, the capacity of existing and proposed schools that could serve the site, and student generation rates. Del Mar Union ESD and San Dieguito Union HSD include both permanent and district-owned relocatable classrooms in calculating total capacity. The elementary schools responsible for providing school facilities for the subarea area, Del Mar Heights and Del Mar Hills, are currently operating at 98 percent and 110 percent of permanent capacity, respectively. The junior and high schools to which project students would be sent, Earl Warren Junior High and Torrey Pines High are operating at 15894 percent and 13993

percent of permanent capacity, respectively. In October 1994, the district approved a Master Development School and Facilities Needs Analysis, which indicates that there is currently no capacity for additional students district-wide. Both the San Dieguito Union HSD and Del Mar Union School District are currently using portable classrooms to alleviate overcrowding in permanent facilities.

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TABLE 4L-1
CURRENT ENROLLMENT, ENROLLMENT CAPACITY, AND STUDENT GENERATION RATES FOR SCHOOLS IN PROJECT VICINITY

School	Grades	Fall 1997 Enrollment	Enrollment Capacity*	Student Generation Rate (student/du)
Del Mar Union School District				
Del Mar Heights Elementary	K-6	671	687	Multi-family – 0.146 Single-family – 0.472
Del Mar Hills Elementary	K-6	576	523	Multi-family – 0.146 Single-family – 0.472
San Dieguito Union High School District				
Earl Warren Junior High	7-8	1,038	1,140	Multi-family – 0.02 Single-family – 0.11
Torrey Pines High	9-12	2,316	2,182	Multi-family – 0.07 Single-family – 0.22
San Dieguito High	9-12	1,147	1,200*	Multi-family – 0.07 Single-family – 0.22
Solana Beach School District	**	**	**	Multi-family – 0.131 Single-family – 0.434

SOURCE: Fall 1997 enrollments, enrollment capacities, and student generation rates, Del Mar Union ESD, 1997 and San Dieguito Union HSD, 1998.

*Solana Beach School District does not have existing schools in the project area.

**Enrollment capacity includes both permanent and temporary capacities.

Currently, Earl Warren and Torrey Pines have 20 on-site portables. The use of portable classrooms is considered a temporary rather than permanent measure.

b) Parks and Recreation

According to the Progress Guide and General Plan of the City of San Diego (1989), the criterion for population-based parks and facilities is service for "a resident population of 3,500 to 5,000 persons within a 1/2 mile radius" and they should contain "a minimum usable area of 5 acres when located adjacent to an elementary school or 10 acres when not

so located." Parks meeting this standard are referred to as neighborhood parks. Larger facilities intended to serve a more extensive population are referred to as community parks. These community parks should supplement the facilities in neighborhood parks. The criterion for a community park reads as follows: "Community facilities should serve 18,000 to 25,000 residents within approximately a 1-1/2 mile radius. Ideally they should have at least 13 usable acres if adjacent to a junior high school or 20 usable acres if not so located." Because community parks are primarily used for playing fields, usable acres are generally defined as acreage graded to a two percent or less slope (Fye, pers. com. 1992). However, this guideline can be relaxed for pathways and picnic areas where a flat surface is not as critical (Fye, pers. com. 1992).

The Framework Plan for the NCFUA shows a community park northeast of the project site in the northeast portion of Subarea IB. The Framework Plan requires that neighborhood park requirements and locations be determined at the subarea planning stage.

Table 4L-2 lists existing and proposed parks in the communities surrounding the project area. The nearest existing and proposed neighborhood and community parks are located in the Carmel Valley community located immediately west of the project site and were sized in accordance with the population needs of that community.

TABLE 4L-2
EXISTING PARKS IN THE PROJECT VICINITY

Park	Site Developed?	Acreage	Adjacent School
Neighborhood Parks			
Solana Highlands	Yes	12	Solana Highlands Elementary
Carmel Del Mar Park	Yes	12	Carmel Del Mar
Ashley Falls Park	Under Construction	12	Under Construction/open Fall 1998
Carmel Center Park	Yes	12	Elementary School
Crest Canyon Park	No	10	None
Community Parks			
Black Mountain Ranch	No	30	None
Canyonside	Yes	20	None
Carmel Valley Town Center	Under Construction	18	Proposed junior high school
Regional Resource-based Parks			
Black Mountain	N/A		None
San Dieguito River Park	No	80,000	None
Torrey Pines Golf Course and City Park	Yes	420	None
Torrey Pines State Reserve and Beach	N/A	1,750	None
Los Peñasquitos Canyon Preserve	N/A	3,000	None

The North City West Community Plan and Carmel Valley Neighborhood Precise Plans identify one planned neighborhood park in Neighborhood 4, approximately one and one-half miles west of the project site. This park will consist of approximately 12 acres and will be adjacent to a planned school. Torrey Highlands Park, approximately one mile south of the site and two miles west of the site, has picnic and play areas, as well as paths leading to view areas overlooking the project site (see Landform Alteration/Visual Quality discussion). This approximately seven-acre park is not part of the population-based recreational facilities shown on Table 4L-2 but was developed as "enhanced open space" by the Carmel Del Mar developers. The Carmel Valley North Community Park is being designed, with construction to start in fiscal year 1997. One existing community park (Canyonside) is located approximately six miles southeast of the proposed project site adjacent to the Los Peñasquitos Canyon Preserve. The preserve itself is comprised of approximately 3,000 acres with associated access trails for hikers, mountain bikers, and equestrians. The preserve can accommodate up to 664 users at one time. The Black Mountain Ranch project, northeast of the project site in Subarea I of the NCFUA, proposes to provide a community park.

The portion of Gonzales Canyon which crosses the project site is within the Focused Planning Area of the San Dieguito River Valley Regional Open Space Park, a planned resource-based park (defined as a park located at or centered around some natural or man-made feature). Other resource-based parks available to project area residents include the planned Black Mountain Park, Torrey Pines Golf Course and City Park, and Torrey Pines State Reserve and Beach. Los Peñasquitos Canyon Preserve is also located in the vicinity, south of the site.

Fairbanks Ranch and The Farms Country Clubs are also located just north of the project area. These private/semiprivate facilities may be joined by future project site residents.

c) Library

The Progress Guide and General Plan establishes guidelines and standards for branch libraries. Ideally, branch libraries should serve a resident population of 30,000 and may be established when a service area, which is expected to grow to 30,000 residents within 20 years of library construction, has a minimum population of 18,000 to 20,000. Branches should be located in areas of intense people activity, with a 2.0-mile maximum service area, where trips can be combined with other daily trips. Library design should be flexible to accommodate changing community needs and possible conversions to other (such as commercial or office) uses in the future. Under the Framework Plan, a minimum of one branch library is to be located in the NCFUA based on the population figures proposed in the plan.

There are no branch libraries located within the project site. The Carmel Valley Library, located at 3919 Townsgate Drive, is the City of San Diego library nearest the project.

This 13,000-square-foot branch library is approximately 1.5 miles west of the project and was constructed to serve existing need in the Carmel Valley Community. The 20,000 square-foot Rancho Peñasquitos Branch library is approximately 2.5 miles east of the project site and is located at 13355 Salmon River Road. Other libraries within 5.0 miles include Solana Beach Library at 981 Lomas Santa Fe Drive (approximately 2.5 miles northwest) and Rancho Santa Fe Library at 17040 Avenida de Acacias (approximately 2.0 miles north).

In addition to these branches, the City of San Diego Public Library operates a Bookmobile that is used primarily to bring books to immobile people, educate elementary school children, and provide access to books when a particular branch is closed for some reason. The City of San Diego also is part of a county-wide cooperative relationship known as the Serra Cooperative Library System. This cooperative library system allows residents of the City of San Diego and the county of San Diego to use facilities of other public libraries in the same area.

For example, a resident of the City of Carlsbad could use the City of San Diego Main Library or any branch library facilities through the Serra Cooperative Library System, and a resident of the City of San Diego could use the library facilities at the City of Carlsbad. This system expands the accessibility of public library facilities to communities that are adjacent to each other.

d) Fire Service

The project area is within the service area of the City of San Diego Fire Department. To provide adequate fire protection to the community, the Fire Department strives to provide a six-minute response time to areas in need of service. The City's Progress Guide and General Plan establishes guidelines and standards for fire protection services. Fire stations should be sited to provide rapid response time within urbanized areas and should occupy a minimum of 0.5 acre of land.

Fire protection services for the proposed project site is provided by City fire stations located in Carmel Valley and Mira Mesa. As identified in Table 4L-3, the best current response time to the project site from surrounding fire stations is approximately 4.1 minutes from Station No. 24, located approximately 1.2 miles south-southwest of Pacific Highlands Ranch. Currently, there are 4 firefighters at Station 24 and 10 at Station 41 (see Table 4L-3). All firefighters are EMT-D certified and both stations are manned 24 hours a day with a minimum of four firefighters per engine and truck company.

TABLE 4L-3
FIRE STATION RESPONSE TIMES

Station	Location	Response Time to Pacific Highlands Ranch
San Diego Fire Department Station 24	13077 Hartfield Avenue	4.1 minutes
San Diego Fire Department Station 41	4914 Carroll Canyon Road	13.4 minutes

e) Police Service

The City's Progress Guide and General Plan identifies the Police Facilities Plan as the resource document for Police Department standards. The Police Facilities Plan establishes a seven-minute average response time as a department goal. The Progress Guide and General Plan recommends that stations be located near the geographic centers of areas to be served and that the stations have access to major streets and freeways.

Police protection for the project area is provided by the Northern Division of the San Diego Police Department, located at 4275 Eastgate Mall in La Jolla. There are presently 157 sworn police officers and 16 nonsworn personnel assigned to the division. The City of San Diego Police Department presently maintains a city-wide ratio of 1.65 sworn personnel per 1,000 residents. (Waskiewicz, pers. com. 1997)

The City of San Diego is divided into "service areasbeats" for patrol purposes. The city-wide average police response time is seven minutes for emergency and priority one calls. The Northern Division response time is seven to eight minutes. Although the Northern Division is currently operating at a minimum staffing level of 80 percent of budgeted strength, the current level of service is within the acceptable range of calls for service/officer ratios.

The police facility at Eastgate Mall is approximately six miles to the south of the Pacific Highlands Ranch project site.

The NCFUA Framework Plan states that a police substation should be sited within the NCFUA to attain the department's goals of an average seven-minute response time. The department indicates that the NCFUA police station should be a 20,000-square-foot facility, ideally constructed on a four-acre site. The Police Department is proposing the development of a new police station (Northwestern Division) on Del Mar Heights Road at Hartfield Avenue with full service operations beginning by July 2002. The Northwestern Division will service Subareas' I, II, and III.

f) Water

Pacific Highlands Ranch is within the water service area of the City's existing Miramar Water Treatment Plant. Currently, potable water is delivered to the project site via the 30-

inch Del Mar Heights Pipeline. This pipeline traverses Pacific Highlands Ranch, following the existing alignment of Black Mountain Road and continuing west through Carmel Valley to Interstate 5 along Del Mar Heights Road.

Water from the Miramar Water Treatment Plant is reduced in pressure before it is delivered to the northern areas of the city. The Del Mar Heights Pipeline is currently supplied from two separate pressure reducing stations. A pressure reducing station at the 36-inch Ranch Bernardo Pipeline brings water from the east directly to the project site. A second pressure reducing station off the 36-inch Miramar Extension Pipeline delivers water from the south via the Soledad Valley Pipeline.

Currently, the existing users of potable water in Pacific Highlands Ranch are primarily large commercial growers. The growers in Pacific Highlands Ranch are served from private distribution systems which originate at the Del Mar Heights Pipeline. The City's only distribution pipelines within the proposed development are in Rancho Santa Fe Farms Road and Caminito Mendiola Road, serving users south of Black Mountain Road in the existing estate-lot single family residences.

A planned Capital Improvement Project (CIP) for the City's domestic water system which will ultimately affect supply to Pacific Highlands Ranch is the proposed Carmel Mountain Road Pipeline. This pipeline is planned as a 24- or 30-inch diameter transmission pipeline extending east-west between the Rancho Bernardo Pipeline and the Soledad Valley Pipeline. A portion of this pipeline and a pressure reducing station have been constructed from the Rancho Bernardo Pipeline to the eastern border of the NCFUA. Exact plans for the location of the pipeline are uncertain; however, the pipeline may be realigned with either SR-56, or Black Mountain and Carmel Valley Roads.

Through two planning efforts currently under way, the City of San Diego is preparing to serve this and other North City developments through existing and planned water treatment and distribution facilities. A facility plan is currently being prepared for the Alvarado Water Treatment Plant, and a citywide water system master plan is being performed concurrently. The City of San Diego is also in the preliminary design phase of a 15- to 20-million-gallon storage reservoir to be located northeast of the project site. The City's preferred site for this regional facility is on the Black Mountain Ranch property, which is part of Subarea I. A reservoir at this location could supply the Del Mar Heights Pipeline through the Rancho Bernardo Pipeline.

City of San Diego Ordinance No. 0-17327-NS (New Series) (adopted July 1989) requires use of reclaimed water, when available, for irrigation of landscape areas as allowed by County Health Department regulations. At present, reclaimed water is allowed for road parkway and medians, commercial and industrial uses, irrigation of public maintenance areas within multi-family areas, parks, and greenbelts, and agricultural crops not for

human consumption. Further discussion of reclaimed water can be found in Chapter 4.M of this report.

g) Sewer Facilities

The Carmel Valley Trunk Sewer (CVTS), an existing City of San Diego gravity trunk sewer, collects wastewater from communities between Interstates 15 and 5. The CVTS wastewater flows westward through Carmel Valley, crossing Interstate 5, and turns south along Sorrento Valley road to the City of San Diego Sewer Pump Station 65. Wastewater flows are then pumped to Sewer Pump Station 64, which in turn pumps these flows and flows from other trunks to the Point Loma Wastewater Treatment Plant.

The CVTS is approximately 34,000 feet long and consists of pipeline diameters of 18, 21, 24, 27, 30, and 33 inches. The sewer was originally constructed in the early 1970s of Reinforced Plastic Mortar, pipeline material, commonly known as Techite. Subsequent projects since the original construction have relocated, replaced, and upsized some sections of the pipeline. The remaining sections of the original pipeline are now deteriorating and in need of replacement.

Tributary to the CVTS is the El Camino Real Trunk Sewer, which flows north to south through the Carmel Valley development and joins the CVTS east of the I-5. The El Camino Trunk Sewer conveys flows from Sewer Pump Station 79 and two 8-inch force mains together with wastewater collected as it gravity flows through Carmel Valley. The two parallel 8-inch force mains are in the alignment of Old El Camino Real, which forms the northwest border of Pacific Highlands Ranch.

An existing 15-inch sewer collects flows from nurseries located in the northwest corner of the subarea. This 15-inch sewer flows west, crossing over the 8-inch force mains and collecting flows through a portion of Subarea II before gravity flowing into Pump Station 79.

h) Waste Management Services

At present, the project would be served by Miramar Landfill, which encompasses approximately 1,423 acres, 857 acres of which are used for disposal currently. As of March 1998, the remaining capacity of Miramar Landfill was estimated to total approximately 30.4 million cubic yards (cy), and is anticipated to reach capacity by the year 2011. The landfill currently accepts in excess of 1.3 million tons (approximately 2.1 million cy) of refuse each year (Tirandazi, pers. com. 1997).

In 1989 the State Assembly passed the Integrated Waste Management Act, Assembly Bill (AB) 939, which requires each city and county within California to recycle or divert 25 percent of its current waste stream from landfills by December 1995 and 50 percent by

December 2000. It is anticipated that with implementation of source reduction and recycling programs and rock aggregate extraction program (which excavates construction materials from the landfill in order to create additional disposal area), the Miramar Landfill will serve as a solid waste disposal site through the year 2011.

With respect to the project site, it should be noted that the project area is not located within the City's existing curbside recyclable materials and yard waste collection service areas. Other City services are available to all residents and would be affected by the project. Refuse collection services for the commercial/industrial development, and multi-family residences would be provided by the private sector, thereby not affecting City refuse collection forces. The City offers commercial/industrial waste reduction programs, which may be affected by the proposed project. The service provider for single-family homes depends on whether access to the project site would be via private or public streets. Should the residential units be accessible through public streets, single-family residential collection would be provided by City collection forces. Each City collection crew handles about 4,000 homes per year (weekly collection) at a cost of about $90 per home per year. Residential solid waste collection service would be provided on public streets by the City of San Diego and by private companies such as USA Waste, Allied, and Waste Management on private roads.

Public Services/Facilities Issues

1. How would implementation of the Subarea Plan affect public services, particularly schools, parks, libraries, and police and fire protection?

2. Would implementation of the plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater? Would implementation of the subarea plan result in the generation of excessive amounts of solid waste?

I) Issue

How would implementation of the Subarea Plan affect the public services, particularly schools, parks, libraries, and police and fire protection?

Impacts

a) Elementary, Middle, and High Schools

The proposed alternatives for Pacific Highlands Ranch would create an increased demand for educational facilities. A generation factor of number of students per dwelling unit is

used to estimate the number of new students a development would bring to an area (see Table 4L-1).

Del Mar Union School District

Subarea Plan 1. The proposed project, under this plan, would result in the addition of 1,325 single-family dwelling units and 1,723 multi-family dwelling units within the Del Mar Union School District boundaries. The District's student generation rates of 0.472 for single-family units and 0.146 for multi-family units would generate a total of 877 elementary school students for this school district.

If the private high school site, junior high school site, and one of the elementary schools sites is not developed and redesigned for residential use, then there could be a potential increase in the number of residential dwelling units. Under this scenario, an additional 300 single-family units and 182 multi-family units would be added that would fall within the Del Mar Union School District boundaries. Given this situation, an additional 168 elementary school students would be generated for a total of 1045 (877 + 168) students for this school district. ~~The proposed project would result in approximately 1,733 new multi-family dwelling units and 3,241 new single-family detached units. The student generation rates for the district that would serve the area would result in 1,291 elementary students, 448 junior high students, and 846 high school students.~~

Subarea Plan 2. The proposed project, under this plan, would result in the addition of 1,940 single-family dwelling units and 1,733 multi-family dwelling units within the Del Mar Union School District boundaries. The District's student generation rates of 0.472 for single-family units and 0.146 for multi-family units would generate a total of 1,169 elementary school students for this school district.

If the three school facilities (private high school, junior high school, and one elementary schools) are not developed and are redesigned for residential use then an additional 414 single-family units and 26 multi-family units would be added within the Del Mar Union School District's boundaries. Given this scenario, an additional 199 elementary students would be generated for a total of 1,368 students (1,168 + 199) for this school district.

Solana Beach School District

Subarea Plan 1. The proposed project, under this plan, would result in 1,856 single-family units and 70 multi-family units within the Solana Beach School District boundaries. Using the District's student generation rates of 0.434 for single-family units and 0.131 for multi-family units, a total of 815 elementary school students would be generated.

Under this plan, there would be a potential increase in the maximum number of dwelling units should the private high school, junior high school, and one elementary school not be developed and redesigned for residential use. However, all residential units generated under this scenario would fall within the boundaries of the Del Mar Union School District and would not generate any additional students for the Solana Beach School District.

Subarea Plan2. The proposed project, under this plan, would result in 1,300 single-family units and no multi-family units within the Solana Beach School District boundaries. Using the District's student generation rate of 0.434 for single-family units a total of 564 elementary school students would be generated.

Again, should the three school facilities discussed above not be developed then there would be a potential increase in the number of dwelling units. However, any additional units would occur within the boundaries of the Del Mar Union School District and would not generate any additional students within the Solana Beach School District.

San Dieguito Union High School District

Subarea Plan 1

The proposed project, under this plan, would result in a total of 3,161 single-family units and 1,813 multi-family units. Given the District's junior high school student generation rates of 0.11 for single-family units and 0.02 for multi-family units, 384 junior high school students would be generated. The District's student generation rates for high schools is 0.22 for single-family units and 0.07 for multi-family units. Using these rates, a total of 822 high school students would be generated.

Under this plan, there could be a potential increase in the number of residential dwelling units should the three school facilities discussed previously not be developed and redesigned for residential use. Under this scenario, an additional 300 single-family units and 182 multi-family units would be added and would fall within the San Dieguito Union High School District boundaries. Given this situation, an additional 37 junior high school students and 79 high school students would be generated for a total of 421 junior high school students and 901 high school students.

Subarea Plan 2. The proposed project under this plan would result in a total of 3,240 single-family units and 1,733 multi-family units. Given the District's junior high school student generation rates of 0.11 for single-family units and 0.02 for multi-family units, 391 junior high school students would be generated. The District's student generation rates for high schools is 0.22 for single-family units and 0.07 for multi-family units. Using these rates, a total of 834 high school students would be generated.

If the three school facilities (private high school, junior high school, and one elementary schools) are not developed and are redesigned for residential use then an additional 414 single-family units and 26 multi-family units would be added within the San Dieguito Union High School District's boundaries. Given this scenario, an additional 46 junior high school students and 93 high school students would be generated for a total of 437 junior high and 927 high school students for this school district.

Given that the existing schools in all three school districts are operating above permanent capacity in the project area, the addition of new students can only be accommodated through expansion of facilities and development of new schools.

Three new elementary schools, one junior high, and one public high school site are included in the Pacific Highlands Ranch Plan. The proposed senior high school would be sited in the Town Center area, as the location reinforces the important role of the school within the community. The proposed junior high school would be sited as to organize the community and allow for a variety of transportation means to serve the school. The elementary schools would be located adjacent to the neighborhood parks. The combined use of the schools and parks would provide for easy access for the surrounding neighborhoods and town center by trails and paths. The siting of schools in Plan 1 and Plan 2 conform to the Progress Guide and General Plan site size standards for schools. The affected school districts, the applicant, and the City shall ensure that adequate school facilities are built in a timely manner as outlined in the Master Development School and Facilities Needs Analysis.

b) Parks

Using a generation rate of 2.6 persons per household (SANDAG Series 8 Population Forecast), buildout of the proposed Subarea Plan would result in a population of approximately 12,932 persons. Based upon Progress Guide and General Plan specific standards for population-based parks (2.4 acres per 1,000 persons), the project would generate a demand for 30 acres of community and neighborhood parks.

The development of parks in Pacific Highlands Ranch will ensure that the community has adequate park facilities and spacing.

Pacific Highlands Ranch has approximately 50 acres of land utilized for parks and recreation pursuits (30 acres of community and neighborhood parks and 20 acres of urban amenity open space). An Environmental Tier, as noted in Chapter 3.C, consists of approximately 1,300 acres within the subarea. These acres will be preserved or enhanced to become a vital element of the NCFUA-wide tier. There will be approximately 15 miles of trails within the tier, designated specifically for hiking, biking, or equestrian uses. Off-site linkages will also be provided to significant natural resources outside the proposed project site.

The Pacific Highlands Ranch Plan proposes three parks: one community park and two smaller neighborhood parks. The neighborhood parks will be located adjacent to the elementary schools, while the community park will be located in the proximity of the Village. The Plan also includes a civic use area located in the Village, and three open space overlooks located across the subarea. A third neighborhood park would be required if the private high school is not built. A two-acre site shall be reserved adjacent to the elementary school proposed west of SR-56 and east of Carmel Valley Road. Development of the private high school will relieve the developer of this requirement.

The two neighborhood parks located within Pacific Highlands Ranch will total approximately 10 acres. A 5-acre park adjacent to an 11-acre elementary school site is proposed in the eastern portion of the project site, and a 5-acre park adjacent to a 12-acre elementary school is proposed in the northern portion of the project site. The neighborhood parks will be well integrated into the residential areas of the community by virtue of their connections to pedestrian paths and bikeways. Recreational uses associated with the neighborhood parks and facilities include play areas, multipurpose courts, picnic facilities, trail and bikeway connections, lawn, and landscaping.

The community park has been sited near the Village to provide future residents access to both the Environmental Tier and the Village. The size of the community park varies with each plan. Plan 1 would require a 13-acre community park as it would be adjacent with a common boundary and grade, to the ~~senior high school, and~~ junior high school. Plan 2 would require a 20-acre community park as it would stand alone. The siting of the community park near the Village would increase its overall use and value to the community. Recreational uses associated with this community-wide facility will include: athletic fields, multi-purpose courts, picnic facilities, trail and bikeway connections, play areas, a recreation building, lawn areas, and landscaping. A 5-acre civic use area would be located in the Village and would be used for the library, civic activities, and open-air public gatherings. The civic use area would be connected with the rest of the community by trails and mass transportation.

The open space overlooks would be located at various vantage points across Pacific Highlands Ranch (see Figure 3-2 and 3-3) and would offer future residents views of the native topographic features of the area. The overlooks would be part of the trail system that would serve the urban and natural spaces, and would include benches, informational signs, and would also provide an area to initiate and terminate hikes.

c) Libraries

The new residents of Pacific Highlands Ranch would incrementally increase the demand for library facilities. The establishment of a new library branch requires at least 18,000 to 20,000 new residents, with the expectation of serving about 30,000 within 20 years.

Pacific Highlands Ranch is only expected to have a resident population of approximately 12,000; however, the library will serve the entire NCFUA.

A library site has been designated in the Village of Pacific Highlands Ranch. This siting will enhance the cultural and civic aspects of the entire community. The location of the library will allow library usage to be combined with other business, civic, and shopping activities.

d) Fire Service

The added fire protection requirements of the proposed development would create a need for additional fire protection facilities. Although Station 24 would provide adequate fire protection and emergency response services to all of the subarea, the additional residential units under the proposed project plans would incrementally increase the demand for fire services.

A 3.0-acre double fire station facility (including a wildfire unit) is proposed to be located in the eastern portion of the proposed project site. This facility would be developed according to the City's Progress Guide and General Plan for fire protection services. The site would allow the Fire Department to attain its goal of a maximum response time of six minutes in most cases. However, until the new fire station is operating, the Fire Department may not be able to provide a six-minute maximum first response time to all portions of the subarea.

e) Police

Funding for police services is provided by the General Fund of the City of San Diego. The proposed project would create the need for additional police personnel and facilities. The adequacy of police service is a factor of community-wide importance and cannot be entirely resolved on a site- or project-specific basis. Police protection is ordinarily extended to newly developed areas and funded as a function of the increased tax base.

Implementation of the subarea plan would incrementally increase the demand for police services. Any incremental demand in services, in order to provide adequate response times and levels of service to the community, would require an increase in officers, equipment, and support personnel.

Significance of Impacts

a) Elementary, Middle, and High Schools

Currently, all schools in the Del Mar Union and San Dieguito Union High~~Solana Beach~~ school districts are operating at or above capacity within the project area. The generation

of additional elementary school students resulting from development of the proposed project, either under Subarea Plan 1 or Subarea Plan 2 would add to the ~~potential~~already overcrowded ~~ing of the~~ schools. This is considered a significant direct and cumulative impact.

Currently, there is insufficient capacity at Earl Warren Junior High School to accommodate the additional ~~448~~ junior high students generated by buildout of the proposed project, either under Subarea Plan 1 or Subarea Plan 2~~plan~~. This is considered a significant direct and cumulative impact of the project.

Currently, Torrey Pines High School is operating above capacity. The estimated generation of ~~846~~ additional high school students would contribute to the overcrowding of the school. This is considered a significant direct and cumulative impact.

b) Parks, Library, ~~Fire, and~~ Police Services

Development of the subarea plan would incrementally increase the demand for parks and recreation, library, police, and fire services; however, both subarea plans provide sites for a library, ~~a double fire station,~~ and three parks. ~~As a result,~~ The incremental increased demand on ~~these~~ parks, library, and police services would not constitute a significant impact.

c) Fire Services

Development of the subarea plan would incrementally increase the demand for fire services; however, both subarea plans provide a site for a double fire station. Until the new fire station is operating, the Fire Department's potential inability to provide a maximum six-minute first response time would be considered an interim significant impact.

Mitigation, Monitoring, and Reporting

a) Elementary, Middle, and High Schools

1. The development of the proposed on-site elementary, junior high, and high schools would accomplish mitigation of the project's direct impact to schools from the subarea plan. School facilities financing and mitigation agreements between the affected school districts and the project applicants would be required at the time the Subarea Plan is approved by the City Council ~~tentative maps are processed would be required~~ to ensure that the impacts on school facilities ~~educational services~~ are mitigated to a level less than significant. In addition, prior to granting a ministerial or discretionary entitlement for a parcel, such parcel shall be subject to the terms of a mitigation agreement entered into by the

landowner and the applicable School Districts or included in a community facilities district established by the applicable School Districts and authorized to fund the acquisition of school sites and construction of schools.

b) Park, Library, ~~Fire,~~ and Police Services

No mitigation is required, as adequate library, ~~fire,~~ police, and community park facilities are provided for in the proposed subarea plan or in surrounding areas.

c) Fire Service

Until the new fire station is operating, developers shall demonstrate to the satisfaction of the City Fire Department that a response time of six minutes or less from Fire Station 24 to all portions of new developments can be achieved. For those areas of such new developments where a six-minute response time cannot be provided, individual sprinkler systems or other construction or site design safeguards, approved by the Fire Department, shall be required prior to the issuance of building permits.

2) Issue

Would implementation of the subarea plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater? Would implementation of the subarea plan result in the generation of excessive amounts of solid waste?

Impacts

The proposed Pacific Highlands Ranch Plan includes the development of 4,974 residences; however, the number of residential units could increase to 5,456 if the private high school site is not developed as a school, and the third elementary and junior high schools are not needed. These sites would be redesignated for residential use.

a) Water Service

Although the availability of water in southern California could become a constraint in future years, the policy position of the San Diego County Water Authority is that it is capable of providing potable water in quantities required by its member agencies. This policy is implemented by augmenting supplies when necessary to meet the growing needs of the service area. It can be assumed that an adequate water supply would be available to the subarea.

The City of San Diego Water Department requires projects to submit a comprehensive water facilities study. All required on- and off-site water facilities, as determined by the

approved comprehensive water study, must be completed and accepted by the City prior to the occupancy of any buildings. The existing regional infrastructure would be sufficient to provide the projected water consumption volume. Local improvements would be required to bring the water to the site. These improvements would be in place prior to development.

Average water demand estimates are based on 150 gallons per capita per day for residential use, 4,000 gallons per net acre per day for fully landscaped parks, and 5,000 gallons per net acre per day for commercial/institutional and school uses (City of San Diego 1994a). The estimated water consumption rates have decreased over past years due to increased consumption awareness, conservation goals, and water rationing. The anticipated water usage rates at buildout of 5,456 residential units with an average 2.6 persons per dwelling unit would represent an estimated consumption of 2,127,840 gallons of water per day. The estimated water consumption for commercial/industrial, schools, employment center, and public facilities would be 1,025,000 gallons/day. Water consumption for the neighborhood and community parks would be 120,000 gallons/day. Total water consumption for the project would be 3,272,840 gallons/day (Table 4L-4).

Chapter 4.M, Water Conservation, of this MEIR includes an analysis of the project's design elements to conserve water.

TABLE 4L-4
ESTIMATED WATER USAGE
(million gallons per day)

Land Use	Amount	Unit Water Usage[1]	Estimated Water Usage (mgd)
Residential	14,186 persons	150 gpd/capita	2.128
Commercial	33 acres	5,000 gpd/acre	0.165
Schools/Public Facilities	152 acres	5,000 gpd/acre	0.760
Employment center	20 acres	5,000 gpd/acre	0.100
Parks	30 acres	4,000 gpd/acre	0.120
TOTAL			3.273

gpd = gallons per day.

[1]Generation rates obtained from the City of San Diego Water Utilities Department (Juyhari, pers. com. 1993).

TABLE 4L-5
ESTIMATED WASTEWATER GENERATION
(million gallons per day)

Land Use	Amount	Unit Wastewater Generation[1]	Estimated Wastewater Generation (mgd)
Residential	5,456 units	280 gpd/unit	1.528
Commercial	33 acres	3,180 gpd/acre	0.105
Schools/Public Facilities	152 acres	2,500 gpd/acre	0.380
Employment center	20 acres	2,500 gpd/acre	0.050
TOTAL			2.063

gpd = gallons per day.

[1]Generation rates obtained from the City of San Diego Water Department (Juybari, pers. com. 1993).

b) Sewer Facilities

The City of San Diego Water Utilities Department has calculated sewage generation at 280 gallons/day/dwelling unit, 3,180 gallons/acre/day for commercial and industrial uses, and 2,500 gallons/acre/day for schools, public facilities (town green), and employment centers (Juybari, pers. com. 1993). Therefore, buildout of the proposed subarea plan is estimated to generate 2.063 mgd of sewage effluent (see Table 4L-5).

The Pacific Highlands Ranch Plan would include the requirement that a site-specific water facilities study be prepared. All required on- and off-site water facilities as determined by the approved water facilities study must be completed and accepted by the City prior to the occupancy of any buildings. All future tentative map approvals shall incorporate and implement the appropriate recommendations of the water facilities study.

c) Waste Management Services

The proposed development will generate different kinds of solid waste. Using the City of San Diego's Environmental Services Department's waste generation factors, the project's waste stream would be divided as follows: (1) construction waste; (2) residential waste constituting about 8 percent of the total project's waste; and (3) commercial/industrial waste constituting about 92 percent of the total project waste stream.

Construction Waste

Although the proposed project would generate construction waste intermittently over several years, it is likely that the proposed project would exceed the City's Environmental

Services Division's recommended construction threshold for construction projects involving more than 10,000 square feet of building area. The preparation and implementation of a waste management plan for construction would be necessary.

Ongoing Residential/Commercial/Industrial Waste

As explained above, the project would produce residential waste amounting to only about 8 percent of the total project's waste stream. Based on research conducted on the quantity and the types of solid waste generated by the residential sector in the city of San Diego, the primary components of the waste stream are paper (29.6 percent) such as newspaper and mixed paper, yard waste (13.4 percent), plastic (7.2 percent), wood waste (6.2 percent), and glass (5.3 percent). In addition to residential use, the project consists of commercial and industrial development. Because the specific types of commercial and industrial uses are not known at this time, the types of solid waste produced by this development are also not known. Although the types of materials in the commercial and industrial waste stream vary considerably depending on the type of use, in general, paper, plastic, food, and metal are typically the most significant constituents.

The current waste generation rate for city residents is 2.0 tons/dwelling unit/year for single-family residential, 1.2 tons/dwelling unit/year for multi-family residential, 0.0066 ton/ square foot/year for commercial use, and 0.0036 ton/square-foot/year for industrial/office use (based on the average of waste generation factors for a combination of office/industrial uses and commercial uses, respectively). Using Environmental Services Division's waste generation factors, annual waste generation associated with the proposed uses would be 12,016 tons/year, as shown in Table 4L-6.

Significance of Impacts

a) Water and Sewer Facilities

Potentially significant impacts to water and sewer facilities are anticipated with the development of the subarea due to a lack of existing facilities to serve the area.

b) Waste Management Services

The project could generate a significant amount of construction debris during the construction phase. Also, during the ongoing use of the site solid waste generation would exceed the 60 tons/year and 52 tons/year threshold of significance for solid waste impacts for residential and non-residential projects, respectively, established by the City's ESD. The project would affect City waste management programs and services; however, impacts could be minimized by incorporation of recycling and waste reduction measures in project design.

TABLE 4L-6
SUBAREA III SOLID WASTE GENERATION
(tons/year)

Source	Proposed Units/ Sq. ft.	Generation Rate	Yearly Waste Generated
Single-family Residential	3,461 dwelling units	2.0 tons/du/year	6,922
Multi-family Residential	1,995 dwelling units	1.2 tons/du/year	2,394
Commercial Uses	300,000 sq. ft	0.0066 tons/sq. ft/year	1,980
Employment/Office Uses	200,000 sq. ft	0.0036 tons/sq. ft/year	720
TOTAL			12,016 tons/year

NOTE: Generation rates obtained from the City of San Diego Environmental Services Department (Tirandazi, pers. com. 1997).

Mitigation, Monitoring, and Reporting

a) Water

Future developers shall be required to provide appropriate water studies consistent with the findings and conclusions of the Miramar 712/North City 610 Water Study. Each developer shall be responsible for installing all those facilities identified in the accepted studies which are necessary to serve their developments. All public water facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

b) Sewer

Prior to any new development within the subarea, developers shall be required to provide sewer studies showing the proposed sewer system for the subarea. All public sewer facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

c) Solid Waste

The project's prime contractor in cooperation with the City of San Diego's Environmental Services Department shall develop a comprehensive waste management plan. The plan shall describe programs that would be implemented to reduce the potential for direct and cumulative impacts to the City's waste management services to below a level of significant. The plan shall address construction phase as well as long-term waste management issues. The Development Services shall review this plan to ensure that the ESD has signed the plan and certified that it is consistent with City policy regarding its waste management services.

Following is a list of options that could be considered for the construction phase of the project and specified in the waste management plan:

1. Source separation for all construction debris such as wood, aggregate, drywall, and other discarded products including glass, plastics, and cardboard at the project sites and subsequent recycling of the materials.

2. Buying recycled or using recycled content construction material, such as acoustical ceiling tiles made from newsprint, tiles made from recycled glass, insulation made from mixed paper, as well as many landscaping products such as pavement made from recycled asphalt and tires, and mulch and compost made from green waste.

3. Use of postconsumer aggregate base and mulch in project landscaping;

4. Use of drought-tolerant landscaping to minimize the amount of green waste generated.

Following is a list of options that could be considered to address long-term waste management issues:

1. Provision of each single-family unit with kitchens designed to facilitate recycling;

2. Source separation and recycling of demolition debris;

3. Provision of yard composters designed to encourage backyard composting.

4. Provide devices or chutes in multi-family residential units for convenient separation and recycling of materials.

The project applicant shall develop a solid waste management plan explaining how these options will be incorporated. The plan shall describe the location of exterior and interior storage areas for the collection of recyclables in multi-family residential and non-residential areas as required per Municipal Code Section 101.2001. The project proponent shall ensure the storage areas are located in areas convenient for use by residents or tenants and service providers.

M. Water Conservation

Existing Conditions

a) Water Supply and Distribution

Most of San Diego's water is imported from the Colorado River via the Colorado River Aqueduct or from northern California via the California Aqueduct, which is part of the State Water Project. The San Diego County Water Authority (SDCWA) purchases ~~acquires~~ the imported water from the Metropolitan Water District of Southern California and is the wholesaler of. ~~The SDCWA sells~~ water to 23 member agencies, including the City of San Diego. The member agencies are the retailers who provide water to the general public.

Prior to transport south to San Diego, raw water is stored and treated at Lake Skinner in southern Riverside County. From Lake Skinner, the water is transported to San Diego County via the First and Second San Diego Aqueducts. Lake Hodges (to the north) and Miramar Reservoir (to the south) are the closest reservoirs. The existing City of San Diego reservoir system is not designed to capture storm runoff to take effective advantage of local rainfall but stores imported water, the supply of which fluctuates based on the snowpack in northern California. Within the past few years, the city experienced severe drought conditions due to high local demands and low snowfall and recharge rates in the northern part of the state.

A detailed account of past and present agricultural production in Pacific Highlands Ranch may be found in Chapter 4.I of this MEIR. Currently, approximately 400-500 acres are used for tomatoes, cucumbers, green beans, squash, sweet corn, bell pepper, celery, and strawberries production and 1,000-1,500 acres are in a five- to six-year fallow cycle. Currently, these agricultural crops are irrigated with treated water. Nursery use has fallen over the past few years, and consequently, so has the use of irrigation water. Also, approximately 30 residences consume water in the subarea.

b) Water Conservation

The SDCWA and the City have reacted to the drought conditions that characterized southern California in the late 1980s and early 1990s. As a result of these conditions, the policy position of the SDCWA and the City has been to implement water conservation measures to reduce potable water uses. Overall, water conservation measures in the city have been effective. A city-wide conservation goal of 20 percent from 1991 to 1995 was achieved, and since then a 10 percent goal has been achieved annually (Generoso, pers. com. 1997). Although no longer in a severe drought condition, San Diego is still in a "drought watch." In addition, the city can experience "structural drought," a condition in

which potable water supplies are restricted due to drain-off of available water for other required uses, such as native species preservation.

For the past several years, the City has been conditioning qualifying development projects within the city to install facilities for the use of reclaimed water to offset the demands of potable water of new planned uses. In 1992, the City completed a reclaimed water distribution master plan for the City's northern service area. As a requirement of the 1992 plan, new developments are required to design and install reclaimed water distribution systems which would irrigate all common areas and open space. The irrigation systems would initially be supplied from the City's potable water supply; however, when reclaimed water becomes available, the systems would be converted to reclaimed water service.

Other water conservation efforts include the City Council's approval of becoming a signatory to the Memorandum of Understanding Regarding Urban Water Conservation in California, support of proven water conservation strategies, and the creation of the City Manager's Water Conservation Advisory Committee to review proposed long-term water conservation programs.

In September 1994 the City's Metropolitan Wastewater Department implemented an "optimized" reclaimed water distribution system for reclaimed water use in the City's northern service area, which will be primarily served by the North City Water Reclamation Plant, located at Miramar Road and Eastgate Mall. This reclamation plant began to treat wastewater on April 24, 1997. The North City Water Reclamation Plant is designed to treat up to 30 million gallons of wastewater per day. Reclaimed water will be pumped to customers through a 45-mile-long distribution system stretching from Torrey Pines in the west to Scripps Ranch in the east.

Pacific Highlands Ranch, which had previously been conditioned to install reclaimed water facilities, was determined to be located outside of the optimized system service area. Therefore, the condition requiring the installation of reclaimed water facilities was waived for the Subarea (Dillon, pers. com. 1997).

Currently, potable water is delivered to Pacific Highlands Ranch via the Del Mar Heights Pipeline. A detailed discussion of water service in Pacific Highlands Ranch is provided in Chapter 4.1., Public Facilities and Services, of this MEIR.

Water Conservation Issue

1. Would implementation of the plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater?

1) Issue

Would implementation of the plan result in the use of excessive amounts of water, resulting in the depletion of domestic water supplies or the generation of excessive amounts of wastewater?

Impacts

Implementation of the proposed Pacific Highlands Ranch Plan would change the predominant existing land use in Pacific Highlands Ranch from agriculture (approximately 1,300 acres) to residential, commercial, and open space associated with the Environmental Tier. Implementation of the project would, therefore, trade one kind of water use for another.

Water consumption estimates for each of the proposed plans for Pacific Highlands Ranch follow. (For a discussion of water services for consumption estimates, see Chapter 4L, Public Facilities and Services, Issue 2).

Subarea Plan I. The total estimated water consumption for Subarea Plan I would be 2.821 million gallons per day. This is a preliminary estimate and may be higher than the actual use, since current conservation practices are not taken into account. These conservation practices include low-flow faucets, shower heads, and toilets in new residences (the latter required by the City) as well as potential use of native drought-tolerant plantings, in conjunction with water-conserving irrigation systems (see below).

Subarea Plan 2. The total water demand for Plan II would be approximately 2.865 million gallons per day.

Significance of Impacts

Subarea Plans I and 2. It is not anticipated that excessive amounts of water consumption or wastewater generation would result from implementation of the proposed plan. By observing guidelines established in the City of San Diego Water Utilities

Department Planning and Design Guide and Landscape Technical Manual, potential adverse impacts to the city's water supply would be less than significant.

The project's contribution to the cumulative impact associated with water supplies would be reduced to a nominal level by the mitigation measures outlined below.

Mitigation, Monitoring, and Reporting

Subarea Plans 1 and 2. The following mitigation measures shall be incorporated into project design guidelines to address cumulative water usage concerns.

1. Limit grading in areas where no construction is proposed; thereby reducing the need for planting and irrigation of graded areas.

2. Provide lifts of low-clay content soil in landscaped areas to improve infiltration.

3. Reduce runoff potential from landscaped areas by using berming, raised planters, and drip irrigation systems.

4. Install soil moisture override systems in all common irrigation areas to avoid sprinkling when the ground is already saturated.

5. Identify in the plant materials list in the project design guidelines whether or not plants are native or naturalize easily and incorporate a list of local California sources for native plants.

6. Incorporate low-flush toilets, low-flow faucets, and timers on sprinklers (including nighttime watering) into project design.

7. Provide information regarding water conservation measures to new residents at the time of lot purchase.

The Development Services Development Coordinator shall review grading, landscape, and building permits to ensure the above measures have been noted on plans.

N. Public Safety

Existing Conditions

a) Electromagnetic Fields

As shown in Figure 2-3, a San Diego Gas & Electric high-power transmission line easement and overhead electrical distribution line extend through or adjacent to Pacific Highlands Ranch at the eastern boundary of the subarea.

Studies from the late 1970s have suggested a possible relationship between cancer, specifically childhood leukemia, and exposure to electric and magnetic fields or proximity to overhead transmission lines. The available scientific data do not support a conclusion that electric and/or magnetic fields cause health effects. However, due to increasing concern regarding electromagnetic (EMF) fields and health effects and the proximity of the power lines to potential development areas, this issue is addressed in this EIR. CEQA Guidelines Section 15145 states, "If, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact." The following discussion summarizes information gathered to date on EMF effects and their possible ramifications.

High-power transmission lines (such as those described below on the project sites) generate electromagnetic fields, which consist of invisible lines of force that surround anything conducting electricity. An electrical field is created when voltage is established on a wire (i.e., when an item is "plugged in"), while magnetic fields are created with the flow of current (i.e., if there is no current, there is no electrically induced magnetic field). These man-made electric and magnetic fields are ubiquitous in modern America and are generated by all electrical items, including many common household appliances. A small sample of common EMF sources includes refrigerators, televisions, stereos, coffee makers, broilers, electric blankets, fax machines, computers, and light bulbs.

Electromagnetic fields are created by charged particles. The electric component of the field pushes or pulls charged particles, such as ions, in the direction of the field. The magnetic component acts on moving charged particles and pushes them perpendicular to their direction of motion.

Commonly, distributed electric power is alternating current. This is in contrast to the direct current produced by batteries. An alternating current does not flow steadily in one direction, but alternates back and forth. The power used in North America alternates at 60 cycles per second (the current changes direction 120 times per second), which is known as 60 hertz (Hz). Consequently, the electric and magnetic fields produced by the

electric power also oscillate at 60 Hz. Europe and some other parts of the world use a 50 Hz frequency.

The electromagnetic fields produced by 60 Hz power lines have a much lower frequency and, therefore, lower energy than microwaves or X rays, although they are all forms of electromagnetic energy. For comparison, radio waves operate at approximately 10^8 Hz (1,000,000 cycles per second); a television screen operates at approximately 10^8 Hz; visible light occurs slightly below 10^{15} Hz; ultraviolet light ranges from about 10^{15} to 10^{17} Hz; and X rays range from 10^{16} to 10^{20} Hz. The spectrum of electromagnetic wavelengths is shown in Figure 4N-1.

Because X rays have enough energy to break apart the molecules that contain genes, excessive X-ray exposure can lead to mutations and cancer. When microwave energy passes through materials containing water, the energy is absorbed by the materials and converted to heat. This is how a microwave oven works. The electromagnetic fields produced by 60 Hz transmission lines do not have enough energy to break apart molecules, and although they can cause heating in substances, this heat is barely detectable. Normally occurring temperature changes (i.e., temperature changes due to normal biological processes) in human cells are greater than the temperature changes that these electromagnetic fields can produce (Culver Company 1994). Therefore, electromagnetic fields from 60 Hz power transmission lines do not have the same effects on the human body as microwaves or X rays.

Electric fields are measured in volts per meter (V/m) and magnetic fields are measured in teslas or gauss, which equals one ten-thousandth of a tesla. Typical electric field levels within the home or workplace are 1 to 10 V/m; fields within one foot of small appliances reach 20 to 200 V/m; and the field strength directly next to an electric blanket can reach 10,000 V/m. Ten thousand volts per meter is approximately the maximum level directly beneath a 765 kilovolt (kV) transmission line. Electric fields weaken rapidly with increased distance from the source. An electric field with a 10,000 V/m strength at the source will decrease to less than 500 V/m at a distance of 60 meters. Electric fields are also easily blocked by vegetation and buildings. Table 4N-1 shows some common electric field values. Figure 4N-2 shows a lateral profile of an electric field at ground level for typical transmission lines. These profiles assume a flat ground with no intervening obstacles, such as vegetation or walls. The highest-voltage line in the easements in or near the project sites is 230 kV.

The maximum magnetic field value beneath a power distribution line is approximately 50 milligauss (mG), and that directly beneath a 765 kV transmission line is approximately 250 mG. The level directly below a 220 kV line is about 65 mG, which decreases to about 15 mG at a distance of 30 meters. Typical home levels are between 0.1 and 50 mG and the values within several inches of appliances can be 10 to 20 times higher. Unlike electric fields, magnetic fields are not substantially affected by vegetation and buildings.

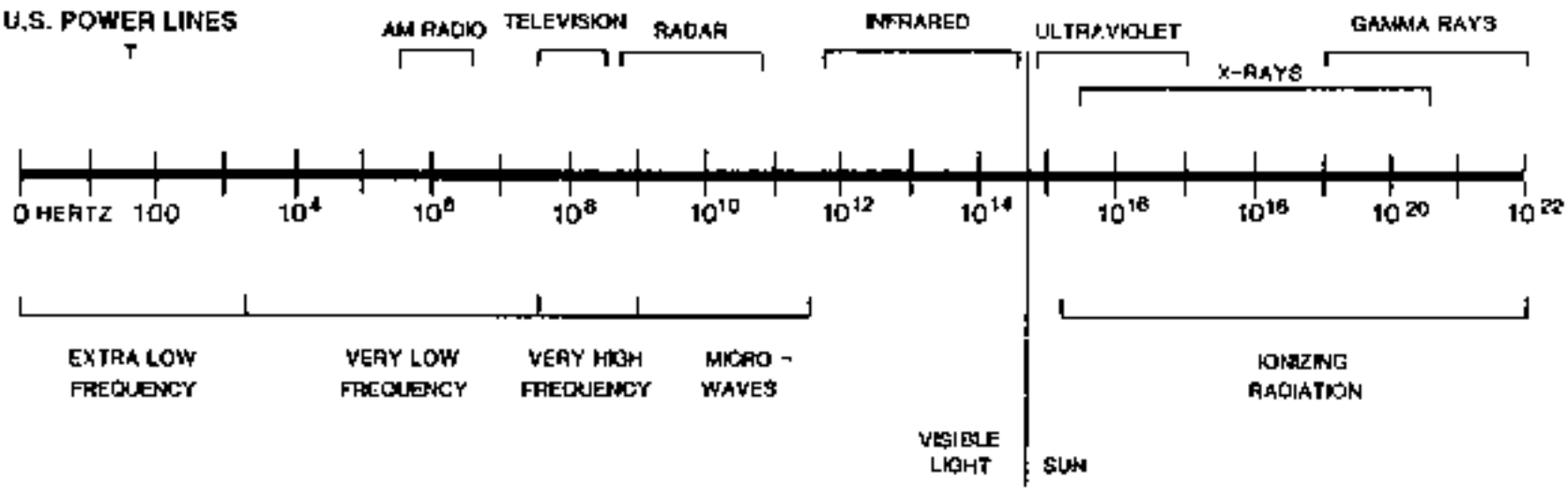


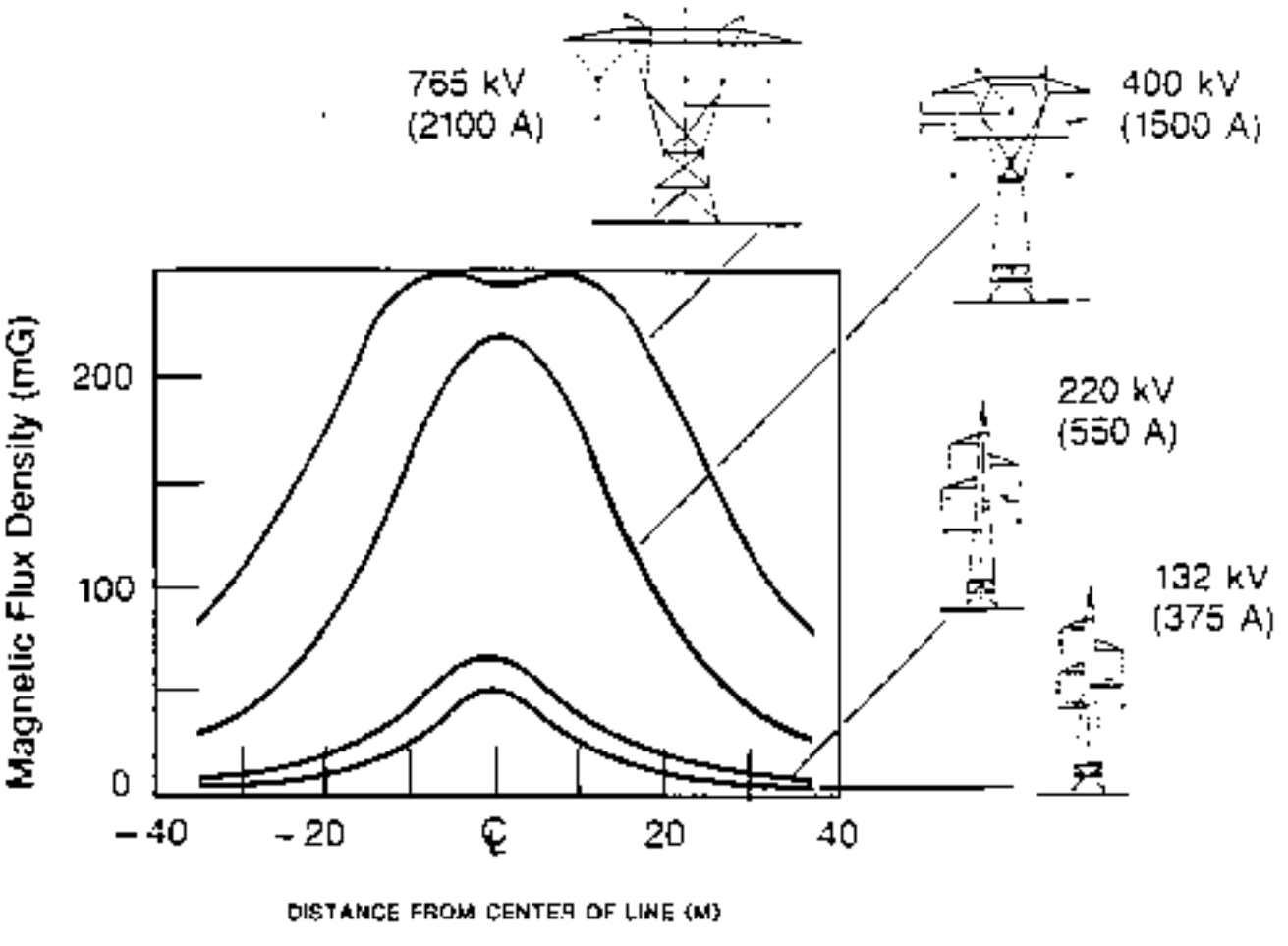
FIGURE 4N-1

Approximate Spectrum of Electromagnetic Fields

TABLE 4N-1
TYPICAL VALUES OF MAN-MADE POWER-FREQUENCY ELECTRIC FIELDS

Source	Electric Field (V/m) at 11.8 Inches from Source
Electric cooking	4
Toaster	40
Electric blanket	250
Iron	60
Broiler	130
Hair dryer	40
Vaporizer	40
Refrigerator	60
Color TV	30
Stereo sound equipment	90
Coffee pot	30
Vacuum cleaner	16
Hand mixer	50
Incandescent light bulb	2

SOURCE: International Electricity Research Exchange 1988.



SOURCE: IERE 1988

FIGURE 4N-2

Lateral Profiles of Magnetic Flux Density of Typical Power Lines

Figure 4N-3 shows a lateral profile of a magnetic field at ground level for typical transmission lines. Table 4N-2 shows some common magnetic field values.

Reports from the Soviet Union of various health complaints among utility workers in high-voltage switchyards in the early 1970s generated worldwide concern regarding the possibility of adverse health effects from exposures to electric fields. Subsequent research on electrical utility workers in Europe and North America failed to confirm the presence of such complaints, and subsequently, Soviet investigators indicated that their earlier concerns had been "overstated" (Bailey Research Associates, Inc. 1992).

In the late 1970s and throughout the 1980s, interest shifted primarily to magnetic fields because of a reported association between the apparent current-carrying capacity of power lines and childhood cancer (Wertheimer and Leeper 1979) and because electric fields from outside sources cannot penetrate building materials and enter homes.

The apparent association to date arises from epidemiological studies, which are based on a statistical association between a pattern of disease (such as cancer) and a factor (such as overhead power lines). This is in contrast to laboratory studies, which develop a cause-and-effect relationship from experimental evidence and are reproducible. Over 20 epidemiological studies have been conducted on this subject with conflicting results, but much of the debate is based on two studies in the Denver area. The first was published in 1979 by Nancy Wertheimer and Ed Leeper. It compared the home environments of childhood cancer victims and a control population to attempt to identify whether any factor related to home environment was statistically associated with the occurrence of cancer. Overhead power lines were identified as a possible factor.

Power delivery systems have high-tension wires which operate at high voltages (up to several hundred kilovolts) to allow power to be transported at relatively low currents. These wires deliver power to distribution substations where the voltage is stepped down, resulting in proportionately higher current in the medium-voltage primary lines. These lines carry power to a local transformer, where the voltage is stepped down again to produce the 240 volts delivered to individual residences. The current flow is greatest in the wires directly issuing from a substation or local transformer. At these points the voltage has been stepped down and "transformed" into current (Wertheimer and Leeper 1979). It was homes particularly close to these transforming points that were over-represented among cancer cases in the Wertheimer and Leeper study.

The magnetic fields produced by the currents in the power distribution lines can be canceled by balancing the supply and return currents (the magnetic field is zero between two lines with currents that are equal in magnitude but opposite in direction). This cancellation is not complete because the wires are often separated in space and because some of the return current does not flow through the wires. Some of the return current may instead go through the ground or, in many cases, through the plumbing system to

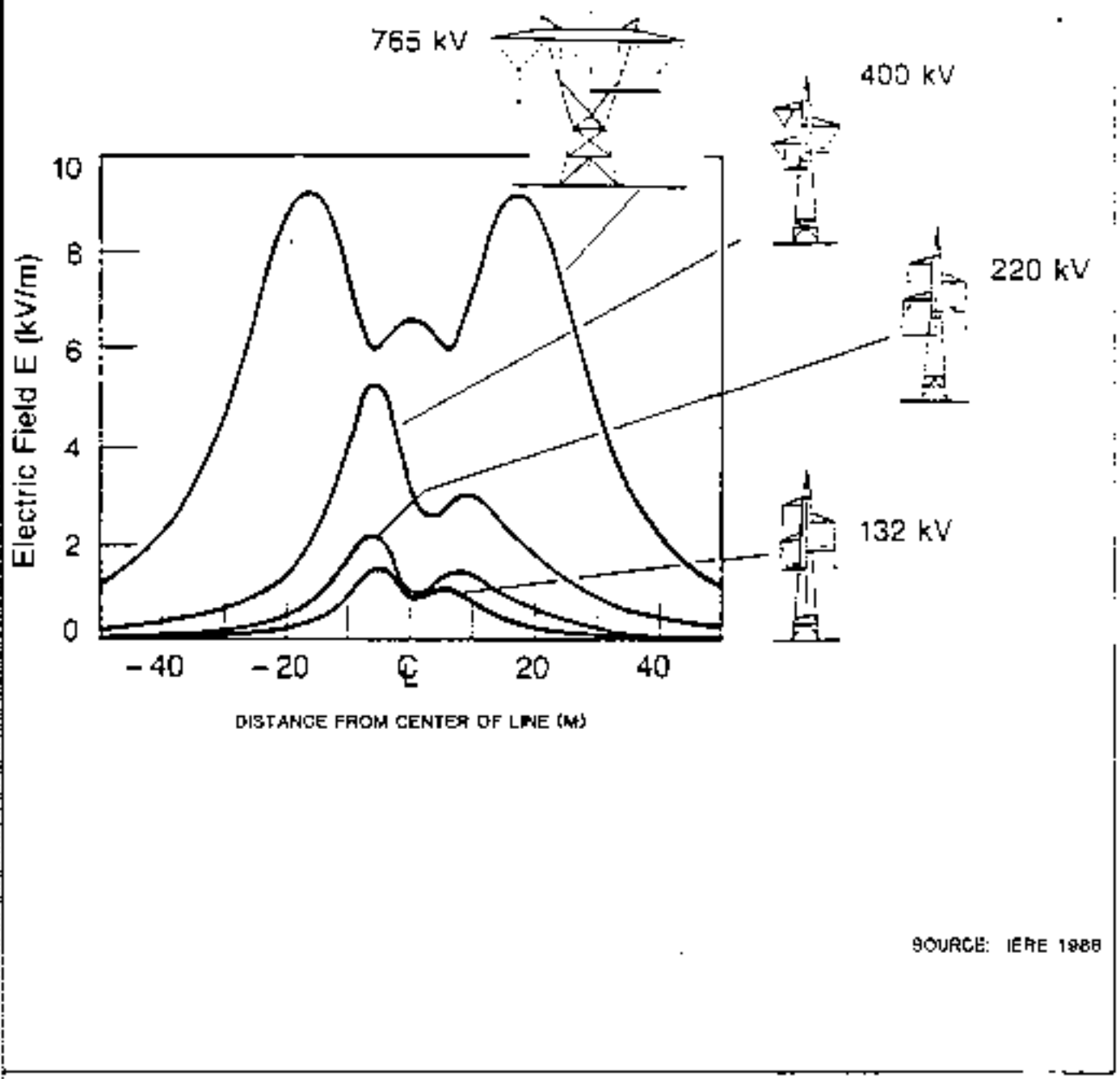


FIGURE 4N-3

Lateral Profiles o.

Electric Field Intensities of Typical Power Lines

TABLE 4N-2
MAGNETIC FIELDS MEASURED AT 11.8 INCHES FROM VARIOUS HOUSEHOLD APPLIANCES

Appliances	Range of Measured Fields (mG)
Ranges	3 - 50
Ovens	1 - 50
Microwaves	40 - 90
Disposals	8 - 12
Dishwashers	7 - 14
Refrigerators	<0.1 - 3
Washers	2 - 20
Dryers	0.7 - 3
Coffee makers	0.7 - 1.5
Irons	1 - 4
Can openers	30 - 300
Mixers	6 - 150
Blenders	5 - 25
Vacuum cleaners	20 - 200
Portable heaters	1.5 - 40
Fans	0.2 - 40
Hair dryers	<1 - 100
Shavers	1 - 100
Televisions	0.3 - 20
Fluorescent fixtures	20 - 40
Desk lamps	5 - 20
Saws	10 - 300
Drills	25 - 40

SOURCE: International Electricity Research Exchange 1988.

which most urban electrical systems are grounded at each house. This results in a locally unbalanced current, both in the distribution wires and in the plumbing.

The Wertheimer and Leeper study states that the ground current flows not only in the street plumbing but also through the pipes in the house. Current which enters the plumbing at one house can flow through several homes before it returns to the distribution wires because the plumbing provides a continuous low-resistance path between houses. The ground current produces a magnetic field which Wertheimer and Leeper state "appears to be roughly related to the types of wiring configurations nearby. This relationship between wires and plumbing is to be expected because, other things being equal, the greatest unbalanced current tends to occur where the total current in the wires is greatest, and the unbalanced portion of the current must detour through ground paths, such as the nearby earth and plumbing."

The Wertheimer and Leeper researchers classified the houses in the study based on the proximity to high-current configuration (HCC) and low-current configuration (LCC) wires. The HCC category was further divided into three subcategories: (1) homes less than 40 meters from large-gauge primaries or an array of six or more thin primaries; (2) homes less than 20 meters from an array of three to five thin primaries or from high-tension (50-230 kV) wires; and (3) homes less than 15 meters from first span secondary (240-volt) wires. First span secondaries were redefined as those secondaries which issued directly from the transformer and had not yet lost any current through a service drop occurring beyond the transformer pole.

However, no attempt was made to measure the actual magnetic field levels present. In other words, children with cancer were reported to be more likely to have power-line wiring outside the home apparently capable of generating higher magnetic fields than were healthy children, although actual exposures were not determined. Additionally, the studies by Wertheimer and Leeper were criticized for not eliminating confounding factors, such as maternal smoking, use of X rays, air pollution, traffic, noise, exposure to hazardous chemicals, and housing density, which might have contributed to the cancer but are unrelated to power-line fields. The classification of the wires was also considered biased because the researchers knew whether the case person of the house had contracted cancer or not. The classification itself was considered arbitrary based on visual inspection.

A second study in Denver was completed which expanded on Wertheimer and Leeper's work and improved some of the weaknesses in the previous methodology (Savitz et al. 1988). A modest statistical correlation between children with cancer and the proximity of their homes to HCC power lines was found. But the correlation between cancer and the actual measured magnetic fields in the homes was weak enough to be included in a statistical margin of error.

Another study that made field measurements of magnetic fields in the homes to estimate exposure (rather than using the crude estimations based on the type of utility wiring outside the home and the distance of the lines from the home) did not report a statistically significant association between childhood cancer and measured fields (London et al. 1991). Several other epidemiological studies conducted in community settings have not detected any association between proximity to power-line sources of magnetic fields and cancer (Fulton et al. 1980; McDowell 1986; Coleman, Bell, and Primic-Zakelj 1989; Myers et al. 1990).

Results of occupational epidemiological studies are also contradictory. Some of these studies indicate a statistical association between some types of cancer and electrical occupations while others do not (California Department of Health Services 1992; Bailey Research Associates 1992). As with the residential studies, the major limitation of the studies completed to date is the lack of data regarding actual exposure, since they use job classification/job titles to estimate exposure (Office of Technology Assessment 1989).

Most recently, a study was completed involving cancer mortality among workers at Southern California Edison Company. No consistent association was found between either work in electrical occupations or magnetic fields measured in the work environment and all cancers combined. A similar study completed in 1992 among Swedish electric utility workers provided results consistent with the Southern California Edison study (Sahl, Kelsh, and Greenland 1993).

There are still relatively little data that give experimental support for a mechanism of cancer development from magnetic fields, but there is growing recognition that these fields may have biological effects based on the fact that every cell in the body has charged particles of various kinds on the two sides of the outer membrane. Thus, cell membranes are much like miniature storage batteries, maintaining a separation of charge across themselves. It is speculated that 60 Hz fields may alter the behavior of charged particles located in or attached to cell membranes. Most investigators agree that the findings are suggestive enough to deserve further inquiry. However, the following conclusion has been reached with regard to the laboratory evidence regarding the association between magnetic fields and cancer:

> Extensive laboratory studies of human and animal cells exposed *in vitro* to 60 Hz electromagnetic fields (EMFs) over a wide range of intensities show no indication of damage to DNA, the capacity to repair DNA damage, micronuclei formation or increased chromosomal aberrations. Therefore, the consensus among members of the scientific community is that 60 Hz EMFs are not cancer initiators (Bailey Research Associates 1992).

The epidemiological and laboratory studies conducted to date, as a whole, do not support the conclusion that exposure to magnetic fields is a cause of cancer (California DOHS

1992; Bailey Research Associates 1992; U.S. EPA 1992). At present, the scientific community does not support the implementation of standards since science has not identified exposure to EMFs as a health hazard nor has it provided any meaningful dose-response data on which to base standards (California DOHS 1992; Bailey Research Associates 1992).

At the local level, the California Public Utilities Commission (CPUC), after investigating the EMF issue, found that available scientific research does not support a conclusion that exposure to low-frequency fields is a health risk. However, the CPUC, SDG&E, and other utilities in California recognize that some public concern and scientific uncertainty exist regarding a potential health risk associated with EMF. As a result, the CPUC issued Decision 93-11-013 on November 2, 1993. In this order, the commission directed California's utilities to standardize guidelines with other utilities where possible.

> The bottom line is that there is no established cause and effect relationship between EMF exposure and cancer or other disease. For this reason, we can't define a hazardous level of EMF exposure (EPA 1992).

Since the possible link between electromagnetic fields from power lines and deleterious health effects has not been established, no land use setback distances from power lines or easements has been recommended except for the California State Department of Education, which requires a 150-foot setback from 230 kV transmission lines for adjacent school sites.

b) Hazardous Materials

Historic use of Pacific Highlands Ranch property has been primarily agricultural. The public safety concern exists that soils on the site may be contaminated by hazardous materials in the form of pesticides and herbicides applied as part of agricultural operations. Pesticides that may have been used on field type crops in the past include DDT and Chlorodane. Both types of pesticides are chlorinated hydrocarbons that persist for a long time after application. Chlorodane has been observed to have a half-life of up to 30 years. Both Chlorodane and DDT have been outlawed. More recently, fungicides and organophosophate insecticides have been used. These insecticides and fungicides breakdown much more quickly than the chlorinated hydrocarbons. Both completely breakdown within one or two days after application.

The County Department of Health and Services Hazardous Materials Management Division case files were examined to determine if the County has a file listing for the project site. The County Hazardous Materials Management Division case files contain records of organizations which have obtained permits for release of hazardous materials. The case file listings did not show any permitted hazardous material sites on or within close proximity to the site.

The County Department of Agriculture has no official directive on this potential public safety issue. However, it does control the application of pesticides and herbicides on agricultural lands through state-mandated requirements to register and record the use of these materials on individual properties. Thus, indirectly the County would not allow the application of pesticides and herbicides that would violate state and federal laws and would pose potential public safety problems.

c) Vectors

Standing bodies of water may provide breeding habitat for mosquitoes, which carry and transmit diseases, including malaria and viral encephalitis. Twenty-four species of mosquitoes found in the county are disease bearing. Mosquitoes require ponded water or slow-flowing sections of streams to deposit eggs and allow larval development.

The only standing body of water on-site that could provide suitable breeding habitat for mosquitoes is the existing reservoir/pond in Deer Canyon. This reservoir is approximately 1,800 feet from the existing residential development of Rancho Glen Estates along Caminito Mendiola.

Public Safety Issue

1. Would implementation of the Pacific Highlands Ranch Plan expose people to potential health hazards?

1) Issue

Would implementation of the Pacific Highlands Ranch Plan expose people to potential health hazards?

Impacts

a) Electromagnetic Fields

Studies of the potential for adverse public health effects due to electromagnetic fields are inconclusive at this point. A statement or conclusion of impacts would be speculative. In accordance with CEQA Guidelines Section 15145, the known information about electromagnetic fields is summarized above and no conclusion is reached.

b) Hazardous Materials

The potential exists that future residents of the project area could be exposed to unhealthy levels of pesticides or herbicides that have contaminated the underlying soils when applied for agricultural purposes. No operations on-site are currently on record with the County as permitted hazardous materials users. However, if the levels of pesticides applied for past agricultural operations have contaminated the soils the impacts to future residents of the project area could be significant.

Land uses planned for the subarea consist of single- and multi-family residential, recreational, and school and park uses. These types of uses do not typically generate significant amounts of hazardous materials.

Although the details of the proposed commercial uses are not known at this time, they are not expected to store, use, or generate significant quantities of hazardous materials which could result in contamination of soils, water, or air.

c) Vectors

The existing water reservoir/pond located in Deer Canyon in the southern portion of the site would remain within the subarea with the implementation of the proposed land use plans. The nearest existing residence is at least 1,800 feet from the pond and the nearest proposed development in either Subarea Plan 1 or 2 is more than 3,600 feet away; therefore, the potential risk for public health and safety due to exposure to disease-bearing vectors (mosquitoes) is considered less than significant.

The collection of storm water runoff in the on-site detention basins could cause operational and aesthetic problems such as algae blooms, eutrophication (oxygen depletion), and odors. The proper maintenance of retention basins would be necessary to minimize the risk of mosquito breeding.

Significance of Impacts

a) Electromagnetic Fields

Studies of the potential for adverse public health effects of electromagnetic fields are inconclusive. A statement or conclusion of impacts would be speculative. In accordance with CEQA Section 15145, the known information about electromagnetic fields is summarized and no conclusion of significance is reached.

b) Hazardous Materials

Future developments shall provide a hazardous soils assessment to be conducted by a qualified professional to determine if hazardous soils are present on-site. If hazardous soils are found, a remediation plan shall be prepared and approved by the County Department of Environmental Health for the project. The recommendations of the remediation plan shall be implemented as a condition of project approval.

c) Vectors

Because the proposed project contains on-site detention basins to serve the subarea, the potential for public health and safety impacts to future residents within the project site are considered potentially significant.

Mitigation, Monitoring, and Reporting

a) Electromagnetic Fields

No mitigation would be required.

b) Hazardous Materials

No mitigation would be required.

c) Vectors

Mitigation measures for potential increased mosquito populations which will decrease potentially significant impacts to below a level of significance are described below. Prior to any grading activities, the applicant shall provide a letter from the County Environmental Health Department Vector Surveillance and Control Division (VSCD) to the environmental review manager of LDR verifying that a vector control program has been designed. Elements of the program may include, but not be limited to the following:

1. The detention basins shall be kept free of debris, high concentrations of nutrients which could contribute to alga blooms, and organic floatage. Any emergent vegetation (e.g., cattails and bulrushes) shall be removed only as necessary to control the mosquito problem.

2. Non-natural runoff to the detention basin shall be minimized by proper drainage patterns to prevent excessive organic material from entering.

3. Although the above measures are designed to minimize the potential for mosquito breeding in the on-site retention basins and control mosquito populations, active control measures may be necessary at times. This would include the application of a

mosquito fog or insecticide spray. The use of this measure should be minimized to avoid reducing populations of other insects. Use of spray application shall be minimal and shall require coordination with VSCD, USFWS, and CDFG.

4. Maintenance of the detention basins shall be the responsibility of a homeowners association or similar maintenance district.

O. Population

Existing Conditions

Pacific Highlands Ranch, with few scattered residences, is essentially undeveloped. Buildout of Pacific Highlands Ranch under the current A-1-10 zoning under PRD regulations would allow approximately 260 dwelling units. The approved Del Mar Highlands Estates and Rancho Glen Estates projects will account for approximately 201 residential units, with an estimated population of 523 (assuming 2.6 persons per household).

According to the 1990 U.S. census, approximately 2.5 million people reside in the San Diego region. From 1980 to 1990, the average annual growth rate was 3.0 percent, as compared to the national rate of 1.0 percent and the state of California growth rate of 2.3 percent.

The entire NCFUA including Pacific Highlands Ranch is located within the North City Major Statistical Area (MSA), one of seven MSAs defined by SANDAG that cover the San Diego region. The North City MSA population grew from 436,352 in 1980 to 569,992 in 1990, a 30.6-percent increase. The January 1, 1996 estimate is 630,774, a 10.7-percent increase from 1990. This represents the largest numeric increase over both time periods of all the MSAs. As home to several large urbanizing communities, such as Carmel Valley and Sabre Springs, this MSA captured 21 percent of the region's population growth during the 1980s and 32 percent since 1990.

SANDAG is the regional agency responsible for preparing population, housing, and employment projections for the San Diego region. As shown in Table 4O-1, the SANDAG Series 8 Regional Growth Forecast (1997b) projects population, housing, and employment data to the year 2015, based on 1990 census data and general plan information available at that time.

Population Issue

1. Would the proposed implementation of either Plan 1 or 2 for Pacific Highlands Ranch alter the planned location, distribution, density, or growth rate of the population?

TABLE 40-1
SERIES 8 REGIONAL GROWTH FORECAST NORTH CITY MSA

	1990	2000	2005	2015	1990-2015 Change	Percent Change
Population	569,992	687,571	741,257	820,904	250,912	44%
Employment	387,733	401,598	436,453	482,796	95,063	24.5%
Single-family residential housing units	148,614	159,649	170,275	187,141	38,527	25.9%
Multi-family residential housing units	80,139	94,487	106,478	129,192	48,053	60%
Persons per household	2.54	2.71	2.68	2.61	+0.07	2.7%
Developed acres (all uses)	83,833	89,104	95,963	114,211	30,379	36.2%
Vacant developable acres	36,254	30,982	24,123	5,875	-30,379	-83.8%

SOURCE: SANDAG Series 8 Interim Forecast (5/95).

1) Issue

Would the proposed implementation of either Plan I or II for Pacific Highlands Ranch alter the planned location, distribution, density, or growth rate of the population?

Impact

The final NCFUA Framework Plan EIR identified the addition of 35,000 people to the North City Future Urbanizing Area as a potentially significant, long-term impact. These residents would have lived elsewhere in the region had the NCFUA not been available for development. Although population growth itself may not be a significant adverse impact, substantial new population centers and associated activity concentration can result in other indirect impacts, including inadequate public services and facilities, traffic congestion, and land use incompatibility.

The proposed Pacific Highlands Ranch Plan includes the development of 4,974 residences; however, the number of residential units could increase to 5,456 if the private high school site is not developed as a school, and the optional elementary and junior high schools are not needed. These sites would be redesignated for residential use.

Implementation of either plan for Pacific Highlands Ranch would not attract a buildout residential population that significantly exceeds that which exists or would result with buildout under existing regulations. The proposed Pacific Highlands Ranch plans call for a total of 5,456 residential units and 500,000 square feet of retail/commercial/employment use. It is expected that development would occur over a 15- to 20-year period beginning in 1998 or 1999, resulting in an average increase of 273-364 housing units and 701-946 people per year. However, the rate of buildout per year would be driven by market forces as well as population changes and could fluctuate considerably from year to year.

The location, distribution, and density of the resident population as proposed in either of the two proposed plans for Pacific Highlands Ranch would be compatible with surrounding existing and planned land uses. Either plan would maintain a relatively low population concentration, when compared to the adjacent communities of Carmel Valley or Peñasquitos. Subarea development would infill the surrounding uses and would not promote "leapfrog" development. In addition, approximately one-half of the subarea would be retained as open space in the Environmental Tier. Assuming a 15- to 20-year buildout, the average annual population increase of 701-946 people in the subarea would not have a significant impact on the regional growth rate. Finally, following its adoption, environmental certification, a vote of the electorate, and a phase shift, the Pacific Highlands Ranch Plan would itself define what would be the planned location, distribution, density, and growth rate of the population in the area.

Significance of Impacts

The Pacific Highlands Ranch Plan and the proposed phase shift from Future Urbanizing to Planned Urbanizing (if approved) would remove a barrier to population growth in the subarea and the rest of the NCFUA. However, assuming a 15- to 20-year buildout, with an annual population increase of 701-946 people, no significant impacts on the planned growth rate for the region are expected. In addition, the Pacific Highlands Ranch Plan includes an effective and comprehensive development phasing program, which would preclude any significant indirect impacts to public services and facilities or traffic congestion.

The proposed project is part of a comprehensive subarea planning program designed to anticipate and resolve indirect impacts caused by increased population. In addition, the Pacific Highlands Ranch Plan includes a strong phasing program to stage development to meet the demand for transportation and public services and thus avoid indirect impacts.

Mitigation, Monitoring, and Reporting

Since the identified population impacts are not considered significant, no other mitigation measures are required or recommended.

Chapter Five
Growth Inducement

Section 15126(g) of the CEQA Guidelines describes growth-inducing impacts as "the ways in which the proposed project could foster economic or population growth, or the construction of new housing, either directly or indirectly in the surrounding environment." If a project has characteristics which may "encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively," then this aspect of the project must be discussed as well. The following discussion primarily focuses on two factors: (1) potential for stimulation of development of property at a greater density than allowed by existing planning and zoning; and (2) a change in the timing of development resulting from extension of public services or road access into an area where previously unavailable.

The 2,650-acre Pacific Highlands Ranch project site is located in an area of approximately 12,000 acres identified as the North City Future Urbanizing Area. Pacific Highlands Ranch of the NCFUA adjoins Subarea II to the west, the Carmel Valley community to the south, portions of the Fairbanks Ranch (City of San Diego) and San Dieguito (County of San Diego) communities to the north, and agricultural and undeveloped land in Subarea IV to the east.

All lands in the NCFUA are designated as agricultural (with A-1-10 zoning) on an interim basis to prevent premature urbanization and protect environmental and fiscal resources by precluding leapfrog development. A Framework Plan for the NCFUA has been adopted by the City as an amendment to the General Plan. This plan would permit the development of up to 14,780 residential units in the NCFUA, including 5,460 units within Pacific Highlands Ranch. Implementation of the Framework Plan is dependent on a phase shift from "future urbanizing area" to "planned urbanizing area."

According to the City of San Diego's Progress Guide and General Plan, the Future Urbanizing designation may be removed upon one of the following:

- The Urbanizing area and Planned Urbanizing area communities of the city approach buildout, or

- Significant opportunities arise to implement the City's balanced housing, land use, or other goals.

At such time as it is determined that one of the two situations has occurred, a General Plan Amendment for a phase shift may be prepared. If approved by the City Council, the amendment would be brought to the voters in a city-wide election for final action in accordance with Proposition A, the Managed Growth Initiative (R-264708, 12-16-85). A subarea plan for Pacific Highlands Ranch must also be prepared and adopted by the City prior to development at the densities permitted in the Framework Plan. See the Land Use discussion in Section 4.A for additional background information on phase shift and subarea planning requirements. A phase shift for the NCFUA was put to the voters on the June 1994 ballot and did not pass.

The Growth Inducement section of the Final EIR for the NCFUA Framework Plan (City of San Diego 1992a) concluded that implementation of the Framework Plan would have a significant growth-inducing impact. That document, which has been incorporated by reference into this MEIR, stated that implementation of the Framework Plan would:

- Foster economic growth through provision of employment opportunities and construction activities related to development of the area;

- Foster population growth with the area and through the provision of additional housing; and

- Remove obstacles to growth by providing roadways, utilities, water, and sewer service to previously unserviced areas.

These statements are also true for the proposed Pacific Highlands Ranch plans. However, the NCFUA Framework Plan addressed buildout of Pacific Highlands Ranch with up to 5,460 dwelling units and 400,000 square feet of commercial and office space. Both proposed subarea plans (Plan 1 and Plan 2) are consistent with the Framework Plan.

Nevertheless, the proposed Pacific Highlands Ranch plans would still remove obstacles to growth by providing infrastructure facilities in previously undisturbed areas, as described in the Framework Plan EIR. In conclusion, either of the proposed subarea plans would have a growth-inducing impact on the area.

Chapter Six
Cumulative Effects

Cumulative impacts are those impacts which by themselves are not significant but, when considered with other impacts occurring from other projects in the vicinity, would result in a total or cumulative impact. As defined in the CEQA Guidelines, a cumulative impact results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable projects. While an EIR should discuss the "severity and likelihood of occurrence" of cumulative impacts, "the discussion need not provide as great detail" as the discussion of the proposed project's effects but "should be guided by the standards of practicality and reasonableness" (CEQA Guidelines Section 15130). In addition, reasonable mitigation measures should be discussed. However, CEQA acknowledges that "with some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis."

This section examines the cumulative effects on a regional and/or local basis depending on the nature of the impact. Regional evaluations are based on areawide planning documents and forecasts. For the purposes of this analysis, the projects considered include (1) projects located within the NCFUA proposing development under the current zoning; (2) projects within the NCFUA that require or are proposing a phase shift; and (3) private and public projects adjacent to or in the near vicinity of the NCFUA. Table 6-1 provides a summary listing of projects considered in the cumulative analysis and the discussion below provides a brief narrative description of the selected existing and proposed projects in the defined region.

A. Cumulative Projects Considered

a) Subarea I of Framework Plan

Located three miles northeast of Pacific Highlands Ranch, Subarea I of the adopted Framework Plan consists of Area 1A and 1B. According to the Framework Plan, Area 1A consists of approximately 4,680 acres. Projected land uses and acreages identified for

TABLE 6-1
CUMULATIVE PROJECTS

	Name of Project	Proposed Development	Status
a)	Subarea I of Framework Plan	Various residential densities, open space, and mixed use	Subarea plan in process
b)	Subarea II of Framework Plan	Estate and low density residential use and open space	No proposed plan
c)	Subarea IV of Framework Plan	Various residential densities, open space, and mixed use	Approved
d)	Subarea V of Framework Plan	Various residential densities and open space, and school and park	Approved
e)	Barne Parcel Subdivision	4 dwelling units	Approved
f)	San Andres West	Residential	Approved
g)	State Route 56	Connects I-5 and I-15	East and west segments built; middle segment proposed
h)	Multiple Species Conservation Program	Regional habitat conservation plan	Approved
i)	Del Mar Highlands Estates	Within Subarea III - residential low density	Approved
j)	Carmel Valley Neighborhood 8	CVREP channel with residential uses	Approved
k)	Carmel Valley Neighborhood 8A	Precise Plan - dwelling units	Proposed
l)	Carmel Valley Neighborhood 8B	Very low density residential	Proposed
m)	Carmel Valley Neighborhood 8C	Low density dwelling units	Approved
n)	Carmel Valley Neighborhood 10	Various residential densities, neighborhood commercial, open space, school, and park	Approved
o)	Rhodes Vesting Tentative Map	Dwelling units	Approved
p)	Showpark Equestrian Center	Equestrian center	Existing
q)	San Dieguito Lagoon Restoration	Wetlands restoration	In process
r)	4S Ranch	Various residential densities, neighborhood commercial, schools, park, and open space	Approved
s)	Fairbanks Ranch	Various residential densities, neighborhood commercial, open space, school, and park	Approved
t)	Santa Fe Valley	Residential golf course, equestrian center, neighborhood commercial, and open space	Approved
u)	Southwest Farms Estates	Residential	Approved
v)	Bougainvillea	Residential golf course	Approved

Area 1A in the Framework Plan included designations of estate (352 acres), very low (2,071 acres), moderately low (156 acres), peripheral (32 acres), local mixed-use (20 acres), and open space (2,050 acres).

Within Subarea I, a revised vesting tentative map was approved in 1995 for 3,690 acres of this site known as Black Mountain Ranch. This map includes plans for 1,121 dwelling units, one 250-acre 18-hole golf course, one 300-acre 18-hole golf course, one 30-acre community park, two 5-acre parks, and 2,171.2 acres of natural open space. The plan also includes a reclaimed water reservoir, potable water reservoir, fire station, community hall, library, senior citizen center, day-care center, church, recreation center, and elementary, middle, and high school sites. The project will construct an extension of Carmel Valley Road from Black Mountain Road to the westerly segment of SR-56. Approximately 893 acres would be subject to future development under existing land use policies or, after a phase shift, under Framework Plan policies. No construction has begun in Area 1A.

According to the Framework Plan, Area 1B consists of an estimated 500 acres. Projected land uses and acreages identified in the Framework Plan for Subarea 1B include residential very low (76 acres), core residential (79 acres), peripheral (123 acres), mixed-use core (41 acres), employment (42 acres), community park (35 acres), and open space (100 acres). A Supplemental EIR and subarea plan are currently being prepared for the North and South Village plans, the resort hotel, and the perimeter properties within Area 1B.

b) Subarea II of Framework Plan

Located approximately 3.5 miles west of Subarea IV, Subarea II encompasses approximately 830 acres that is bisected by the San Dieguito River. The Framework Plan identifies a significant portion of Subarea II as an Environmental Tier land use in conjunction with the San Dieguito River Valley Regional Park FPA. Approximately 580 acres would be designated as open space and 250 acres for development, on which 230 units are planned.

c) Subarea IV of Framework Plan

This 1,330-acre subarea with an approved subarea plan is located north and east of Subarea V. Approximately 270 acres are shown for open space and 1,060 acres for development. Uses within Torrey Highlands include an estimated 2,850 residential units, a school site, employment center, and other mixed uses.

d) Subarea V of Framework Plan

Located immediately west of Subarea IV, proposed development on Subarea V (Del Mar Mesa) would consist of rural residential, a resort site, and over 1,500 acres of dedicated open space.

Del Mar Mesa consists of 2,042 acres, located south of State Route 56, north of the Los Peñasquitos Canyon reserve, between Carmel Country Road and Camino Ruiz. Projected land uses include residential estates, very low density residential, peripheral space, local mixed-use, and open space. A maximum of 685 dwelling units are permitted within Subarea V. A subarea plan was approved for Subarea V.

e) Bame Parcel Subdivision

The approved Bame parcel subdivision is within Pacific Highlands Ranch includes 17 acres located along the east side of Old El Camino Real, approximately 0.2 mile south of the Del Mar Highlands site. Proposed development in the Bame project includes four estate residential homes on 13 acres (with lot sizes ranging between 2.0 and 4.5 acres) and 4 acres of open space.

f) San Andreas West

The San Andres site includes 17.6 acres located north of Via de la Valle and west of San Andres Drive, approximately 1.1 miles northwest of the Del Mar Highlands Estates property. The approved development at San Andres West includes 47 single-family residential lots, two lots for private streets (1.66 acres), and four slope (open space) lots (8.54 acres). On-site excavation includes 80,000 cubic yards of balanced cut and fill (i.e., with no net material import or export). A Mitigated Negative Declaration (DEP No. 94-0437) was approved for the proposed project in December 1994 (Planning Commission Resolution No. 2152-1-PC). Key environmental issues identified for the San Andres West project in that document included biological resources and erosion/sedimentation. The project is under construction.

g) State Route 56

This six-lane state highway would be extended south of Del Mar Highlands Estates through Subareas III, IV, and V of the NCFUA, connecting with existing segments of SR-56 located to the east and west of the NCFUA. Caltrans originally evaluated seven alternative alignments for SR-56 in a Project Work Program analysis. Caltrans is currently preparing a Project Report for a more in-depth analysis of the remaining two alternative alignments for SR-56. The City of San Diego is the lead agency for

preparation of the environmental documentation for this project. The City has completed an environmental constraints analysis for the project and is initiating an environmental impact report.

h) Multiple Species Conservation Program

The City of San Diego and other land use jurisdictions in southwestern San Diego County began development of the MSCP to meet the Metropolitan Wastewater Department's need to mitigate the direct biological impacts associated with mandated improvements to the region's sewage treatment facilities. The MSCP effort was also directed toward mitigating the secondary biological impacts associated with projected growth in the region.

A final joint federal environmental impact statement and state EIR was released in January 1997 on the MSCP Plan and the MSCP was adopted by the City of San Diego in March 1997. On July 14, 1997, the City of San Diego signed an Implementing Agreement with the U.S. Fish and Wildlife Service and California Department of Fish and Game. The Implementing Agreement is the contract between the City and the wildlife agencies, which outlines the obligations and commitments made for the successful completion of the MSCP. The agreement has been signed by all parties and is effective July 17, 1997.

The Implementing Agreement now allows the City of San Diego to issue Incidental Take Authorizations under the MSCP. The ITAs replace the Interim Habitat Loss 4(d) permit that was established in August 1994 for permitting of take of the California gnatcatcher and its associated habitat, coastal sage scrub.

Using the MSCP Plan as a framework plan, subarea plans may be prepared by local general-purpose agencies. The City of San Diego has prepared a subarea preserve plan to guide implementation of the MSCP Plan within its corporate boundaries. The project site is within the northern subarea of the City's subarea plan as part of the Future Urbanizing preserve area. Within the northern subarea, the City proposes to "preserve two-thirds of the Los Penasquitos Lagoon/Canyon/Del Mar Mesa core area within its jurisdiction" (City of San Diego 1996e). To do so, "[p]reserve areas would be acquired or a conservation easement applied, as necessary, to assure wildlife movement and habitat restoration/protection." The subarea plan contains a list of specific guidelines for the proposed NCFUA subarea, including Pacific Highlands Ranch. The proposed Pacific Highlands Ranch Plan has been deemed "functionally consistent" with the MSCP preserve area.

i) Del Mar Highlands Estates

This approved 399-acre project is located within Pacific Highlands Ranch near the western boundary. The 172-unit development is consistent with the underlying zoning and consists of single-family residential units, additional affordable housing units and open space.

j) Carmel Valley Neighborhood 8

Neighborhood 8 is an approved precise plan north of Neighborhood 8A covering approximately 350 acres. This precise plan consists of the Carmel Valley Restoration and Enhancement Plan channel, low-density residential, and open space uses.

k) Carmel Valley Neighborhood 8A

The 390.2-acre Carmel Valley Neighborhood 8A precise plan area is located south of Neighborhood 8 and west of Neighborhood 10 and Subarea V. Proposed land uses have included residential units ranging from very low density to low-medium density, elementary school/community park site, and open space. Precise plans have been proposed for Carmel Valley Neighborhood 8A in both 1994 and 1995 and Final EIRs have been completed. In late 1995, Neighborhood 8A was a component of the 1995 City Manager's Neighborhood 8A Compromise Plan (DEP No. 87-0211, 91-0899, and 94-0576) which included a revised Neighborhood 8A Precise Plan along with other parcels within the North City Future Urbanizing Area. A Final EIR was prepared for the Neighborhood 8A Compromise Plan, and a noticed public hearing was held on the project on October 31, 1995. The Final EIR for the Compromise Plan examined various reduced project and circulation pattern alternatives. No action was taken on any of the Compromise Plan project components by the City Council. The approved Neighborhood 8C Precise Plan removed 39.9 acres from the southwestern portion of Neighborhood 8A. Currently a replanning effort is under way for Neighborhood 8A and a draft precise plan and EIR are being prepared.

l) Carmel Valley Neighborhood 8B

Neighborhood 8B has initiated the processing of a precise plan for the existing Arroyo Sorrento area, north and west of Neighborhood 8A.

m) Carmel Valley Neighborhood 8C

Neighborhood 8C represents a precise planning area which was formerly within Neighborhood 8A. The approved precise plan and VTM for Neighborhood 8C covers 39.87 acres in the southwestern portion of Carmel Valley, located between Carmel Mountain Road and Arroyo Sorrento Road. Developments and acreage allotments within the this area consist of detached single-family residences and open space.

n) Carmel Valley Neighborhood 10

An amendment of the approved Carmel Valley Neighborhood 10 Precise Plan has been adopted. The amendment involved the addition of 128 single-family residential units at four locations throughout the precise plan. These additional residential units would increase the maximum allowable number of units for the entire precise plan from 1,438 to 1,566, an increase of approximately 9 percent. Modification of the approved precise plan grading concept and the grading associated with the approved vesting tentative maps would be required to create building pads to accommodate the additional single-family units. The area to be disturbed by grading throughout the entire precise plan would increase by 22.3 acres.

o) Rhodes Vesting Tentative Map

This approved vesting tentative map is located adjacent to and south of The Villas project site. It is within the Carmel Valley community plan area and consists of 42 single-family residential lots on 10.2 acres. The final EIR for the project identified significant, unmitigated cumulative impacts to biological resources, landform alteration/visual quality, and hydrology/water quality. All the identified direct environmental impacts were mitigated. The project was approved in February 1994.

p) Showpark Equestrian Center

The Showpark Equestrian Center is located on 64 acres southwest of the intersection of El Camino Real west and Via de la Valle. The western boundary of the property is adjacent to The Villages project site. The entire site is disturbed, with a show ring, public viewing grandstands, horse boarding facilities, and parking.

q) San Dieguito Lagoon Restoration

The Lagoon Restoration Project is part of an extensive study being conducted for the western portion of the San Dieguito River valley. Analysis to date includes a baseline

biology study, conceptual restoration alternatives, and a resources summary for the lagoon. The conceptual alternatives study identified 14 possible alternatives. Of these 14, three are presently being studied further and modeled hydrologically. Part of the wetlands restoration will be implemented by Southern California Edison as mitigation for impacts to ocean habitat from the San Onofre Nuclear Power Plant ocean discharge.

r) 4S Ranch

Located south of the project area, the 3,525-acre 4S Ranch is divided into a 634-acre parcel designated as Current Urban Development Area and a 2,981-acre Future Urban Development Area. The OMWD Phase I pipeline includes a 10,000-foot extension along Artesian road to the 4S Ranch plan area. The proposed overall density of the 2,981-acre parcel is 1.85 du/acre. The project will have a significant and mitigable biological resource impacts to 16-acre of wetlands, 186 acres of sensitive upland habitats (169 acres of coastal sage scrub), 5.5 acres of riparian/scrub woodland and wetland habitat, federal/state-listed species, federal C1/C2 candidates and CNPS List 1B, 2 and 4 plant species, and the endangered California gnatcatcher. Significant and mitigable impacts would occur to 53 important or potentially important resources sites, steep slopes within the La Jolla Valley, traffic and circulation, geological, seismic and soils conditions, hydrology/water quality, noise and air quality.

s) Fairbanks Ranch

The community of Fairbanks Ranch along with Del Mar Country Club exists along much of the northern border of Pacific Highlands Ranch in the County of San Diego. The bulk of the land is designated as open space, with the remaining land developed and being developed with estate single-family residences and the golf course.

t) Santa Fe Valley

Located north of the project site, the Santa Fe Valley SPA encompasses approximately 3,163 acres. Approximately 1,404 acres would be preserved as undisturbed permanent open space. Another 374 would be developed mainly as a golf course to act as a buffer between the more sensitive natural open space areas and the more intensive urban development proposed for the remainder of the site. The specific plan proposes development of up to 1,200 residential dwelling with variable densities from 1du/6ac to 4du/ac. In addition to the previously mentioned golf course, a resort-hotel, a 9-hole executive golf course, a congregate care facility, a neighborhood commercial center, community facilities, and supporting infrastructures area also proposed as part of the Specific Plan. Significant environmental impacts identified in the EIR include biology, cultural resources, landform/visual quality, traffic/transportation/circulation, noise, air

quality, geology/oils, hydrology/storm drainage/flood control/ water quality, and public facilities (fire).

u) Seabreeze Farms Estates

This 72-acre property is located in the southwestern portion of Pacific Highlands Ranch; however, in November 1996, voters approved a phase shift to remove the project site from the Future Urbanizing area. This approved residential project includes 300 units, an 8-acre equestrian center, and approximately 35 percent of the property dedicated to open space.

v) Bougainvillea

Within Subarea V is the 383-acre Bougainvillea project site, approximately two miles southeast of Pacific Highlands Ranch. This project, which has been approved, includes an 18-hole golf course, restored and natural open space, clustered residential dwelling units (at a density of one unit per four acres), and affordable housing units. A second phase of a resort hotel is being planned, and a third phase of a mixed-use development along Shaw Ridge Road may also be included in this plan.

B. Cumulative Impacts

The following analysis includes assessment of cumulative effects associated with implementation of the NCFUA subarea plans, as well as consideration of additional local projects. Table 6-2 describes the potentially significant cumulative impacts. The major issues are discussed below.

a) Land Use

Cumulative land use impacts identified in the 1992 EIR on the NCFUA noted that the NCFUA was not consistent with the currently proposed surrounding existing and planned land uses in terms of density and road alignments. Also, implementation of the plan would contribute to a cumulative RPO impact. Only adoption of the RPO alternative would avoid the projects cumulative land use impacts.

b) Transportation/Traffic Circulation

The NCFUA EIR found that the project had a significant cumulative effect on regional degradation of traffic levels of service by incremental daily traffic additions. The cumulative traffic conditions with development of the subarea would result in some street

TABLE 6-2
SIGNIFICANT CUMULATIVE EFFECTS

Issue Area	Occurrence of Significant Cumulative Effects: NCFUA	Occurrence of Significant Cumulative Effects: NCFUA Other Local Projects	Comments
Land Use	Yes	Yes	Potential incompatibilities between the proposed project and existing and planned land uses, roadways, and construction operations. Inconsistencies with established plans and policies relative to residential densities and commercial use.
Transportation/ Traffic Circulation	Yes	Yes	Short-term impacts within NCFUA until build-out of circulation systems. Regional impacts to I-5 link between I-5/I-805 junction and Del Mar Heights Road.
Hydrology/ Water Quality	Yes	Yes	Reduction of regional and local water quality associated with increased erosion and sedimentation, potential discharge of hazardous materials during construction, generation of urban pollutants, and use of reclaimed water.
Landform Alteration/Visual Quality	Yes	Yes	Alteration of existing character and visual quality through urban development, modification of landform and unique topographic features, and potential loss of mature, distinctive, or landmark trees.
Cultural Resources	Yes	Yes	Contribution to regional and statewide trend toward the loss of cultural resources due to expanding urbanization.
Air Quality	Yes	Yes	Generation of short-term (construction) and long-term vehicle emissions within a non-attainment area.
Geology/Soils	Yes	Yes	Increase in potential erosion rates in association with concurrent regional grading activities.

TABLE 6-2
SIGNIFICANT CUMULATIVE EFFECTS
(continued)

Issue Area	Occurrence of Significant Cumulative Effects: NCFUA	Occurrence of Significant Cumulative Effects: NCFUA Other Local Projects	Comments
Natural Resources/ Agriculture	Yes	Yes	Loss of restriction of access to valuable agricultural or mineral resource sites.
Paleontology	Yes	Yes	Proposed grading in geologic formations with variable (including high) potential for occurrence of paleontological resources.
Noise	Yes	Yes	Project-related traffic and urban uses will increase cumulative regional and local baseline noise levels. SR-56 is a major contribution to cumulative noise impacts.
Public Facilities and Services	Yes	Yes	Proposed residential and other uses will increase demand for public services and facilities in concert with other regional development.
Water Conservation	Yes	Yes	Additional requirements for potable water use and sewage generation associated with proposed development

segments and intersections reaching unacceptable levels of service. While traffic from Pacific Highlands Ranch would contribute only a portion of the trips to these unacceptable street segment and intersection conditions, any contribution to a street segment or intersection operating at an unacceptable level would be cumulative significant. Additional, the cumulative traffic would add to the traffic conditions on the area's freeways, resulting in a significant impact.

c) Biology

The area in which the cumulative projects are located comprises approximately 19,000 acres of undeveloped, agricultural, or low rural density housing. This large area supports a wide variety of biological species and habitats and, by nature of its size, is an important biological resource within the City and County of San Diego.

Implementation of past, proposed, and reasonably foreseeable projects would contribute to the loss of each of these habitats, but primarily coastal sage scrub and non-native grassland and southern mixed chaparral. Loss of coastal sage scrub habitat would in turn affect the wildlife species which utilize this habitat, such as the coastal California gnatcatcher, San Diego horned lizard, and orange-throated whiptail. Large open blocks of non-native grasslands, among other habitats, provide raptor foraging habitat. The cumulative loss of these habitats associated with these projects would be considered a cumulatively significant impact.

With the implementation of the MSCP, the predominant habitats (Diegan coastal sage scrub, non-native grassland [formerly active agricultural lands], disturbed areas [current nursery activities], southern mixed chaparral, riparian woodland, and southern oak woodland) would be preserved in large, contiguous areas of habitat in perpetuity. These areas would also be managed, restored, and/or revegetated for long-term persistence through implementation of the MSCP. Cumulative impacts to grasslands would remain significant since the habitat is not significantly conserved.

The conservation of open space and restoration or enhancement of disturbed habitat provided by implementation of the MSCP guidelines and mitigation provided in the proposed project would serve to lessen the potential cumulative biological impacts to a level below significance. However, loss of any riparian (wetland) habitat is considered cumulatively significant and not mitigated.

The plans' biological resources impacts can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

d) Hydrology/Water Quality

The 1992 NCFUA EIR determined that development in the NCFUA would cause significant cumulative impacts to hydrology and water quality from increased runoff, increased erosion potential and the transport of waterborne contaminants.

Also, development of projects outside the NCFUA would increase the amount of erosion from exposed soil areas which contributes to sediment-laden runoff into local drainage courses. Erosion can be destructive to the immediate area and sedimentation can clog waterways and downstream wetland and lagoon areas. Measures incorporated into the projects decrease erosion. These include limiting the grading to the dry season and immediate stabilization of manufactured slopes. These measures to reduce erosion during construction would be combined with long-term measures, such as sedimentation basins, to reduce the erosion potential. However, the incremental areawide contributions of each project are considered cumulatively significant.

Runoff from urban areas can also degrade downstream water quality. Runoff water from the project areas can contain contaminants, such as pesticides, fertilizers, and hydrocarbons. Implementation of BMPs, as discussed in the Hydrology/Water Quality chapter of this MEIR, would lessen this impact. The increased runoff from impervious surfaces to the lagoons along with additional pollutant burden would result in a cumulative significant impact which is not totally mitigated.

The plans' water quality impacts can be avoided only with implementation of the No Project alternative. This alternative is discussed in Chapter 8 of this EIR.

e) Landform Alteration/Visual Quality

The 1992 NCFUA EIR determined that the NCFUA would overall transform the landscape of the project area and lead to significant cumulative effect of open space conversion to developed urban areas. The current combination of proposed projects in the area would alter the existing landforms and visual setting from that of open expanses of rolling hills, valleys, and mesas typical of rural agricultural areas to that of clustered residential and mixed-use areas separated by open space and four- and six-lane roads. By providing circulation roads, local access roads, residential building pads, commercial development, and supporting facilities, terraced and manufactured slopes would be substantially increased from prior agricultural use. The cumulative change in landforms and visual setting from development of the subarea would be significant and not mitigated.

The substantial change in aesthetic character described above would occur under both land use scenarios. This change represents a significant direct and cumulative impact

from on and off site locations. The development of the project site would incrementally contribute to the change the aesthetic character of the subregion in conjunction with the existing and planned development in Carmel Valley and Subareas IV and V.

Although both subarea plans have been designed to minimize impacts to steep slopes and strict compliance with the encroachment thresholds in the development regulations of RPO would require a project redesign. Both plans' inconsistency with the RPO encroachment provisions and landform alteration impacts can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

f) Air Quality

The San Diego area is a nonattainment basin for ozone resulting from emissions of reactive organic gases from autos. Any increase in emissions from automobiles is a cumulatively significant impact. The San Diego Air Pollution Control District is responsible for strategies to reduce air pollution in the air basin and bases its projections of future air quality and pollutant emissions on population and employment growth estimates developed by SANDAG. New housing typically does not have a significant adverse effect on strategies to improve air quality if the project is consistent with the assumptions used in the APCD projection model and does not increase dependency on automobile trips relative to other locations.

SANDAG Series 8 population projection takes into account development in the Framework Plan. Therefore, the proposals for the area are generally consistent with the SANDAG population and air pollutant emission forecast to the extent that the residential development would accommodate new residents in the area or increase the number of automobile trips or vehicle miles traveled. The 1992 NCFUA EIR assessed that the NCFUA would contribute a significant cumulative impact because project-generated traffic would add incrementally to the existing degraded air quality. In the near term, development in the area would be automobile dependent, as employment centers, commercial and retail services, and alternative transit services are not currently developed in the area.

Additionally, the City of San Diego specifies thresholds for the determination of significant cumulative air quality impacts. The number of residential units proposed would exceed the City's thresholds. Therefore, under the City's guidelines, the proposed project would contribute a significant cumulative air quality impact. Both plans' inconsistency with City air quality threshold provisions can be avoided with implementation of the No Project alternative. These alternatives are discussed in Chapter 8 of this EIR.

g) Geology

Future grading activities for the implementation of specific development projects in the NCFUA, including Pacific Highlands Ranch, will result in potentially significant increases in soil erosion. In combination with other regional development projects, increased erosion impacts are considered cumulatively significant.

h) Natural Resources

The region considered in this cumulative analysis has historically been used for agriculture. The 1992 NCFUA Framework Plan EIR identified a significant cumulative impact where the project would contribute incrementally to the regional statewide and national loss of prime agricultural lands and preclusion from future sand and gravel mining in potential mineral resource areas.

The proposed Pacific Highlands Ranch Plan will incrementally add to the region's losses of important agriculture lands and mineral resource areas. This loss is considered cumulatively significant.

i) Public Facilities and Services

The above projects would result in approximately 22,192 single- and multi-family residences. Public services in the area of the project (e.g., schools, fire, police) would not be able to provide for the cumulative new demand with existing facilities, which would constitute a significant cumulative impact. Facilities proposed to serve these residences include sites for schools, fire stations, police stations, one library, commercial areas, community parks, and neighborhood parks. These facilities, combined with existing and planned facilities in Rancho Peñasquitos and Carmel Valley, would adequately meet the needs of these residences and mitigate the adverse effects.

The projects would increase the solid waste generated and the need for landfill capacity. The existing landfill capacity would be used up in 2006 with an estimated increase of 6 percent per year in solid waste generation. Until additional landfill capacity is identified, increased generation is a significant cumulative impact. The City is developing facilities and programs to reduce the waste stream by recycling, source reduction, and composting. Projects that do not facilitate these strategies contribute to the significant impact.

j) Population

The Pacific Highlands Ranch Plan (as well as the other subareas) and the proposed phase shift from Future Urbanizing to Planned Urbanizing (if approved) would remove a barrier

to population growth in the subarea and the rest of the North City Future Urbanizing Area. However, because growth will occur over an extended period of time, no significant impacts on the planned growth rate for the region are expected. In addition, the Pacific Highlands Ranch Plan includes an effective and comprehensive development phasing program, which would preclude any significant indirect impacts to public services and facilities or traffic congestion.

Although development of Pacific Highlands Ranch will likely displace a local undocumented migrant worker population, because the population is illegal and the camps are illegal, development of the subarea cannot be considered a significant impact under CEQA.

Chapter Seven
CEQA Mandatory Discussion Areas

A. Any Significant Irreversible and Unavoidable Environmental Changes Which Would Be Involved in the Proposed Action Should it be Implemented

The most apparent irreversible environmental change associated with development of Pacific Highlands Ranch would be the planned commitment of a major portion of the site to residential, educational, recreational, and open space uses. This conversion of land for these uses is a permanent change. Implementation of the precise plan would result in other permanent changes which have been recognized in this MEIR. These include significant changes to existing landform, land use, noise, and archaeological and biological resources. The existing landform would be altered by grading operations that include cutting the mesa top areas and filling canyon heads to provide development areas. These alterations in the existing landform would be irreversible, and since they are a result of the project land use changes, cannot be avoided without changing the development concept guiding either of the proposed plans for Pacific Highlands Ranch.

Approximately 175 acres of the 2,652-acre subarea include existing or approved development projects. The remaining 2,477 acres currently support agricultural, nursery, equestrian, and biological habitat uses. These uses would be changed with implementation of either of the proposed subarea plans, whereby the site would be used for residential, educational, recreational, and open space uses. These changes in the land use of the site would be irreversible. The proposed uses for each plan are detailed below:

1) Subarea Plan I (SR-56 Alignment "F")

Under this proposed subarea plan, approximately 175 acres (existing or planned development) of the 2,652-acre project site would remain unchanged. The remaining 2,477 acres would be irreversibly altered by implementation of Subarea Plan I.

Approximately ~~1,197~~ 1,211 acres of the subarea land area would be affected by the residential, school, community park, and street development, and approximately 1,26680 acres would be preserved as MHPA open space. The commitment of land to these uses would result in the significant irreversible impacts to on-site biological resources, the permanent conversion of agricultural lands to other uses, and with implementation of the subarea plan an irreversible consumption of energy derived from nonrenewable sources, such as fossil fuel and nuclear fuels. Building materials would be considered permanently used.

2) Subarea Plan 2 (SR-56 Alignment "D")

In terms of irreversible changes to the project site, Subarea Plan 2 is very similar to Subarea Plan 1. Approximately ~~1,179~~ 1,211 acres would be converted to residential, school, community park, and street development uses and approximately 1,26698 acres would be preserved as MHPA open space. The existing 175 acres currently dedicated to existing or planned development would not be affected by the proposed plan. The commitment of land to these uses would result in the significant irreversible impacts to biological resources, agricultural lands, and an irreversible consumption of energy derived from nonrenewable sources. Building materials required for implementation of this subarea plan would be similar to those consumed under Subarea Plan 1 and would be considered permanently used.

B. Relationship between Local Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

The majority of the 2,652-acre Pacific Highlands Ranch site is currently being used for agricultural, equestrian, and nursery purposes. In addition, scattered large-lot single-family homes associated with the agricultural/nursery operations, an approved borrow area, trailers used as nursery/agricultural worker housing, a pet housing facility, and a 29-unit single-family residential development known as Rancho Glens Estates along Caminito Mendiola exist on-site. Undisturbed portions of the site include Diegan coastal sage scrub, southern maritime chaparral, grasslands, eucalyptus woodlands, coyote bush scrub, southern mixed chaparral, scrub oak chaparral, and riparian communities (southern sycamore riparian woodland, mule fat scrub, southern willow scrub, and southern riparian scrub). These habitats provide forage and breeding grounds for a variety of small and large animals. Both the disturbed and undisturbed areas of the site provide a rural, open space character to the site which serves as an important visual resource. In addition, the site contains an estimated 1,300 acres of agricultural land with 500-600 acres farmed in

rotation, and approximately 116 acres of designated MRZ-2 zone lands in the southeast corner of the subarea. Most of the remaining subarea has the potential to provide significant mineral deposits (MRZ-3). A total of 50 prehistoric sites have been recorded with the South Coastal Information Center (SCIC) within Pacific Highlands Ranch.

Adoption of either of the proposed subarea plans would commit the subarea over the long-term for the construction of single-family residential units, commercial and office developments, schools, public parks, other public uses, and roads over about 1,200 acres of the subarea. These developments would result in an increase in the long-term economic productivity of the subarea and would improve transportation efficiency and increase housing and recreational opportunities in the area. These proposed developments would also permanently change the visual character of the project site from an open space, rural appearance to a developed appearance with introduced landscaping and manufactured slopes. The existing agricultural soil, mineral deposits, and biological resources which are present in the future development areas of the site would be eliminated by development and would no longer be available over the long term. Potential significant cultural resources within the development area would be mitigated prior to approval of tentative maps for development sites. However, this would result in damage to the cultural sites and they would subsequently be either removed or covered over by development.

Approximately 1,270 ~~300~~ acres of the subarea would be committed over the long term as resource-based Environmental Tier MHPA open space, for the primary purpose of wildlife habitat, with secondary benefits as recreational and visual resources. Establishment of the Environmental Tier/MHPA Reserve would involve both the preservation of existing wildfire habitat and the creation of improvement of wildlife habitat areas. The Pacific Highlands Ranch Environmental Tier/MHPA would support the long-term regional efforts for the establishment of an interconnected system of wildlife habitat areas throughout the County of San Diego. Thus, the proposed project would create a valuable long-term environmental resources. However, the long-term commitment of 1,270 ~~300~~ acres of Pacific Highlands Ranch as resource-based Environmental Tier/MHPA would preclude the use of the prime agricultural soils, important farmlands and mineral resources located with the Tier. Cultural resource sites in the Environmental Tier would be affected by testing and may then be recovered of preserved in place. Establishment of the Environmental Tier/MHPA would be consistent with MSCP goals.

Thus, the net effect on the uses of the environment and long-term loss of opportunities for use of the on-site agricultural and mineral resources, a permanent change in visual character for most of the project site, damage to and removal of some of the on-site cultural resources, and loss of some of the existing on-site open space and biological resources. However, the project would also result in increased economic productivity of the site (increased employment and tax revenues), the improved transportation efficiency

in the area, the increase in available housing and recreational opportunities (parks, bikeways, and equestrian/biking trails), and the establishment of the Environmental Tier/MHPA open space preserve which would preserve and restore open space and wildlife habitat as part of an interconnected, regional system.

It should be noted that these changes in the use of the environment and the productivity of the subarea would occur gradually over an estimated 20 years. During the first 10 years, many of the existing agricultural, nursery, and equestrian uses would likely remain in operation. In fact, through careful site planning to ensure the long-term compatibility of these uses with adjacent future development in and adjacent to the subarea, many of these existing uses may survive for more than 10 years as non-conforming uses.

The CEQA Guidelines (Section 15126) require that this section of the MEIR address the reasons that the proposed project is believed by the applicants to be justified now rather than reserving an option for future alternatives. Pacific Highlands Ranch and the rest of the NCFUA are surrounded by developed and developing areas. If the Pacific Highlands Ranch plan and associated phase shift are approved, the soonest that new homes would be constructed in the subarea and available of occupancy would be about 2002. By that time it is likely that the remaining undeveloped areas in the city which surround the NCFUA would be nearly built out. Therefore, the timing for the adoption of either of the subarea plans and associated phase shift are considered by the applicant to be appropriate from the standpoint of projected housing need. However, the final determination of whether the proposed phase shift is appropriate at this time will be made by a vote of the people of the City of San Diego, as required by Proposition A of 1985.

C. Effects Found Not to be Significant

1) Risk of Upset

None of the proposed project components would increase the risk of an explosion or release of hazardous substances to the environment due to an accident or upset conditions. There are no land uses proposed on any of the sites which would be expected to store, use, transport, or generate large quantities of hazardous substances. Since there is currently little public vehicular access through the project site, project construction is not expected to result in interference with an emergency response or evacuation plan.

2) Energy

Implementation of the proposed project would not result in substantial demand for or consumption of energy. Future home development would be in compliance with the energy conservation requirements in Title 24 of the California Administrative Code and

would not be high-energy-demand land uses. The proposed Pacific Highlands Ranch plans encourage a pedestrian-oriented design and the use of alternative modes of transportation with facilities for bicycle, transit, and equestrian use. The proposed project would not require the development of a new source of energy.

Chapter Eight
Project Alternatives

The CEQA Guidelines direct that a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project be discussed and the comparative merits of the alternatives evaluated, including the No Project alternative. The discussion should be limited to alternatives that "would avoid or substantially lessen any of the significant effects of the project." Factors that may influence feasibility include "site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries . . . . and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent)" [Section 15126(d)].

In addition to the proposed project, a No Project alternative (required by CEQA), two alternate site designs, three land use concept plans that implement the underlying zone without a phase shift, a land use plan using the SR-56 central alignment, and a RPO alternative are considered. The potential environmental effects of implementing each of these project alternatives are discussed below.

A. Alternatives Considered but Rejected

In May 1993, a draft Subarea III Plan was prepared for the subject property. It provided for the construction of up to 6,500 dwelling units, approximately 400,000 square feet of commercial and office uses; and the associated pubic facilities and transportation network similar to the proposed project. This plan also included the central alignment for SR-56, as shown in the Framework Plan. A city-wide vote in 1993 rejected the request for a phase shift for the entire NCFUA including Subarea III and the project was ultimately withdrawn from consideration.

B. No Project Alternative

The No Project alternative typically implies no development of the project site. This approach would result in the retention of the property in its present condition (i.e., open

space and agricultural lands). As a result, the impacts relating to biological resources, landform alteration/visual quality, agricultural resources, cultural resources, public facilities and services, air quality, noise, and cumulative contribution to traffic congestion associated with the proposed Plans 1 and 2 for Pacific Highlands Ranch would be eliminated.

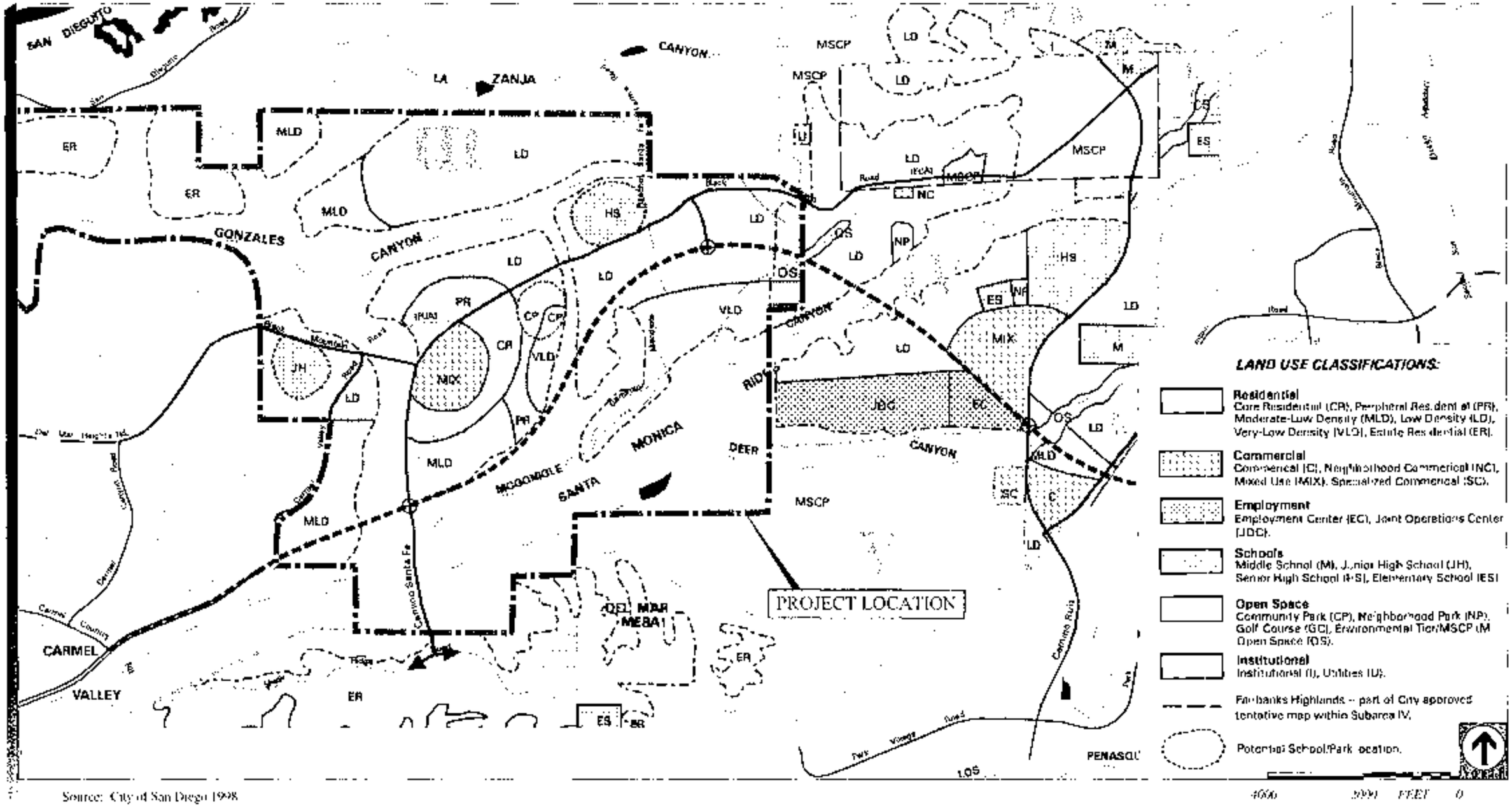
This alternative would not achieve the goals and objectives of the project and the adopted Framework Plan. The Framework Plan objectives of providing housing, facilities benefit assessment fees, and roads would not be achieved. In addition, the permanent contributions provided by the proposed subarea plans to the MSCP preserve would be eliminated.

C. Alternate Site Design - Plan 1

A conceptual alternative site design for Pacific Highlands Ranch Plan 1 (Figure 8-1) has been developed by the City of San Diego which, with the exception of the shown alignment of SR-56, more closely adheres to the land use concept described in the adopted NCFUA Framework Plan (see Figure 4A-1). Table 8-1 provides a comparison of this alternate design plan's land uses with the one proposed by Plan 1. Like the proposed project, this alternative design for Plan 1 includes a similar number of dwelling units, a mixed use core area consisting of commercial uses, community park, various residential densities, and a civic area; a high school, a fire station; and the associated public facilities and transportation network. The site design also includes a junior high school, but does not include an elementary school or neighborhood park. In addition, the alternative design includes moderately low residential densities which are not included in the proposed Plan 1.

Other differences affect the high school which would be shifted away from the MUC to a location further east and north of Carmel Valley Road. The community park and very low-density residential would also be different locations, and an employment center would not be a component of the alternate plan. Residential development would also be extended south of SR-56 near the western boundary which is shown as MHPA open space in the proposed Plan 1. However, as with the proposed Plan 1, the limits of development and grading would cover approximately 50 percent of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

This alternative would reduce impacts to biological resources. The open space design under this alternative, while similar to Plan 1, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP for Subarea III. As noted throughout this EIR, the MHPA as defined by the MSCP Subarea Plan has superseded the Framework Plan Environmental Tier. Thus, the additional open space



Source: City of San Diego 1998

Centerline of Proposed SR 56

Proposed Roads under this Land Use Plan

Existing Roads to be Realigned

Subarea Boundaries

MSCP Boundary

Proposed Interchange Location

Subareas

FIGURE 8-1

Alternate Design - Plan 1

REVISED
TABLE 8-1
ALTERNATE DESIGN LAND USE PLANS
(acres)

Land Use	Alternate Design Plan 1	Proposed Subarea Plan 1	Alternate Design Plan 2	Proposed Subarea Plan 2
Residential				
Estate	172	0	172	0
Very Low Density	125	12	97	12
Low Density	442	544	369	535
Peripheral	48	143	156	147
Core	55	60	39	55
Commercial & Employment Center				
Local Mixed Use	0	0	0	0
Mixed Use Core	45	33	39	33
Service/Commercial	0	0	8	0
Employment	0	20	29	17
Other				
Comm/Neigh. Park	35	24	35	31
Schools	80	152	80	153
Open Space	1,243	1268	1,279	1266
Fire Station	3	3	3	3
Streets/Utilities ROW	146	213	145	215
TOTAL	2,394	2,475	2,451	2,472

*Acres of land use shown in the Framework Plan do not separate freeway from other uses.

ROW = right of way

shown in the alternate plan associated with the northern linkage to La Zanja Canyon in the northwest corner of Pacific Highlands Ranch and the retention of eastern on-site portions of Gonzales Canyon differ from the proposed Subarea Plan. This additional open space would accordingly reduce the impacts to native habitats associated with the proposed Plan 1.

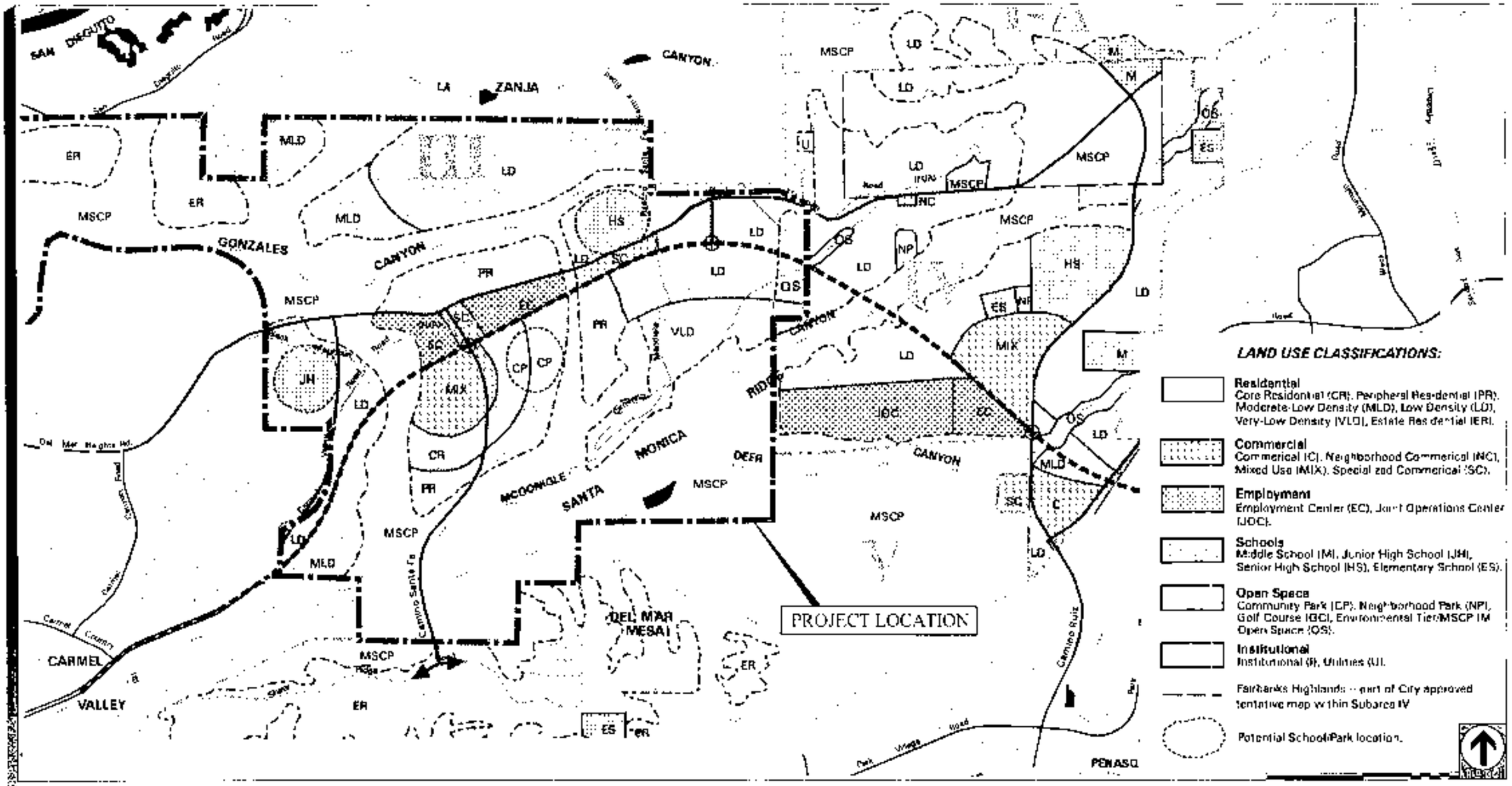
From a circulation standpoint, the major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor ("F" Alignment). The circulation pattern would be similar to the proposed Plan 1, but Camino Santa Fe south of SR-56 would follow a more north-south route through the MHPA. Likewise, Carmel Valley Road, just north of SR-56, would connect to Del Mar Heights Road in a north-south manner. The traffic generation under this alternative would be similar to the proposed Plan 1, and traffic circulation impacts would not substantially differ from the proposed project. This alternative would not create a significant direct traffic impact on the area's circulation system.

D. Alternate Site Design - Plan 2

A conceptual alternative site design for Pacific Highlands Ranch Plan 2 (Figure 8-2) has also been developed by the City of San Diego reflecting SR-56 Alignment "D." Like the proposed project, this alternative design for Plan 2 includes a similar number of dwelling units, a mixed use core area consisting of commercial uses, community park, high-density residential, and a civic area; an employment center; a high school, a fire station; and the associated public facilities and transportation network. The alternate site design also includes a junior high school, but does not include an elementary school or neighborhood park. In addition, the alternative design includes moderately low residential densities which are not included it the proposed Plan 2.

Other differences between the proposed Plan 2 and the alternate site design prepared by the City include the shifting of the high school away from the MUC to a location further east and north of Carmel Valley Road. The MUC would be bisected by Camino Santa Fe under this design, and the acreage shown for employment center and specialized commercial uses would be substantially increased along the north side of the SR-56 corridor. The limits of development and grading would cover approximately 50 percent of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

The differences in environmental impacts between these plans are minimal and the significance of project-related impacts would not be substantially affected. However, the open space design under this alternative, while similar to Plan 2, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP



Source: City of San Diego 1998

FIGURE 8-2

Alternate Design - Plan 2

for Subarea III. As noted throughout this EIR, the MHPA as defined by the MSCP Subarea Plan has superseded the Framework Plan Environmental Tier. Thus, the additional open space shown in the alternative plan associated with the northern linkage to La Zanja Canyon in the northwest corner of Pacific Highlands Ranch and the retention of eastern on-site portions of Gonzales Canyon differ from the proposed Subarea Plan. This additional open space would accordingly reduce the impacts to native habitats associated with the proposed Plan 1. This alternative would reduce impacts to biological resources.

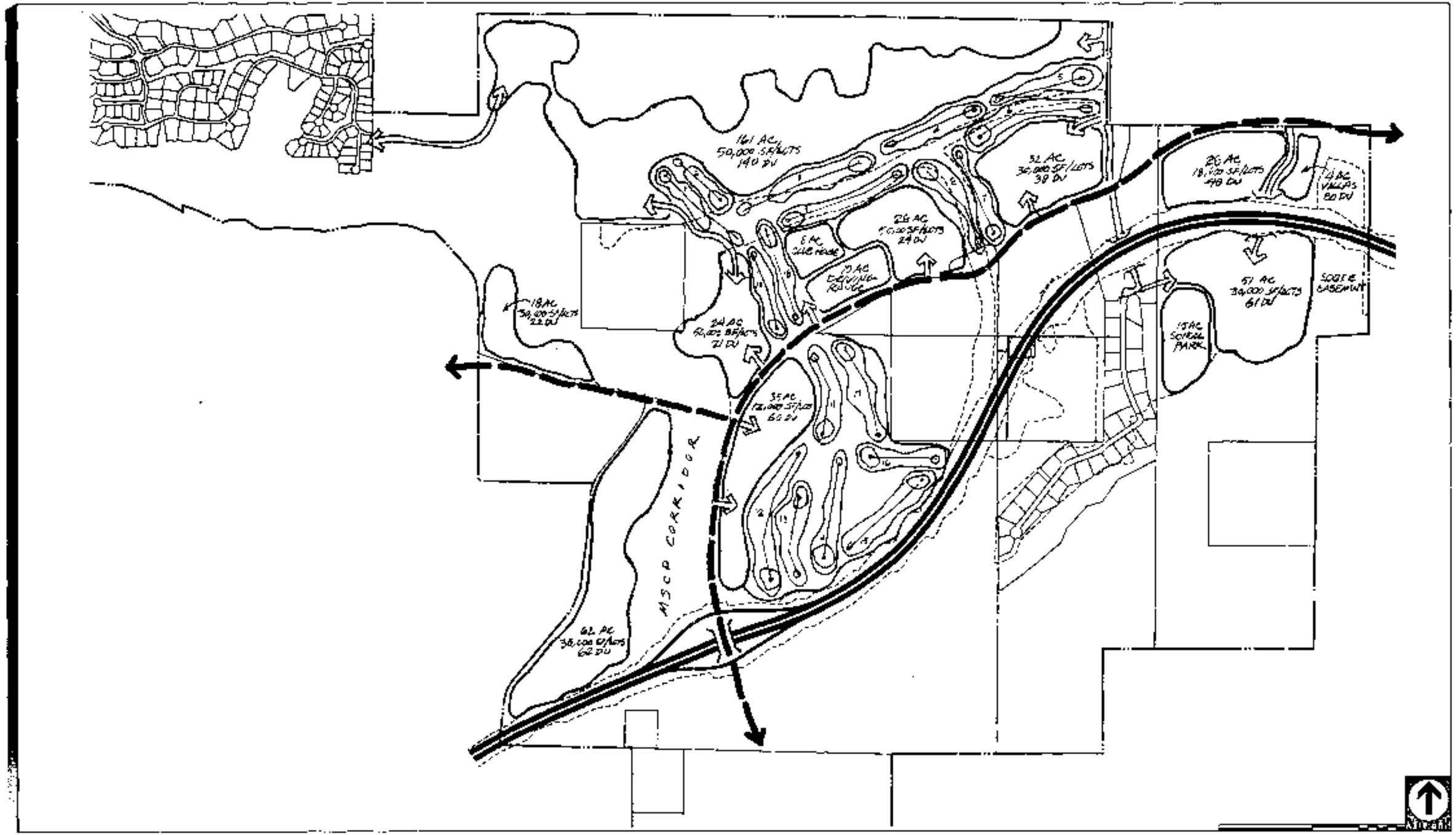
From a circulation standpoint, the major circulation element roads would continue to consist of Carmel Valley Road, Del Mar Heights Road, Camino Santa Fe, and SR-56 freeway corridor ("D" Alignment). However, the alignment of these roadways are less curvilinear north of SR-56 (i.e., Del Mar Heights Road). The traffic generation under this alternative would be similar to the proposed Plan 2. The proposed project would not create a significant direct traffic impact on the area's circulation system.

E. Development without a Phase Shift

The project site could also be developed pursuant to the underlying A-1-10 zoning without a phase shift from Future Urbanizing to Planned Urbanizing. One scenario which could be applied to the project site under the Framework Plan pursuant to Council Policy 600-29 and the Planned Residential Development regulations is development at one dwelling unit per four acres.

A concept plan of a one dwelling unit per four acres with a PRD has been prepared for the Pardee ownership within Pacific Highlands Ranch using three of the SR-56 Alignments: (1) Plan 1 Alignment "F"; (2) Plan 2 Alignment "D"; and (3) the central alignment. Each concept plan is shown in Figures 8-3, 8-4, and 8-5, respectively.

For each of these concepts, this alternative would result in approximately 568 dwelling units, a golf course, driving range, clubhouse, and school park. The total development envelope for the Pardee ownership would occur on approximately 689 acres of the total 1,665-acre Pardee ownership. The residential units would include 416 market rate units on lot sizes varying from 18,000 square feet to 50,000 square feet and 83 affordable housing units at a density of 20 units per acre. The remaining 855 Pardee acres would remain undeveloped, and as stated in Council Policy 600-29, no future development rights would remain with the property. Each of the other ownerships within Pacific Highlands Ranch (approximately 517 acres) could be developed pursuant to the underlying A-1-10 zoning (one dwelling unit per 10 acres) resulting in approximately 52 additional units for a total of approximately 551 units.



Source: Latitude 33 Planning and Engineering, 1998

FIGURE 8-3
Non-phase Alternative (Alignment "F")

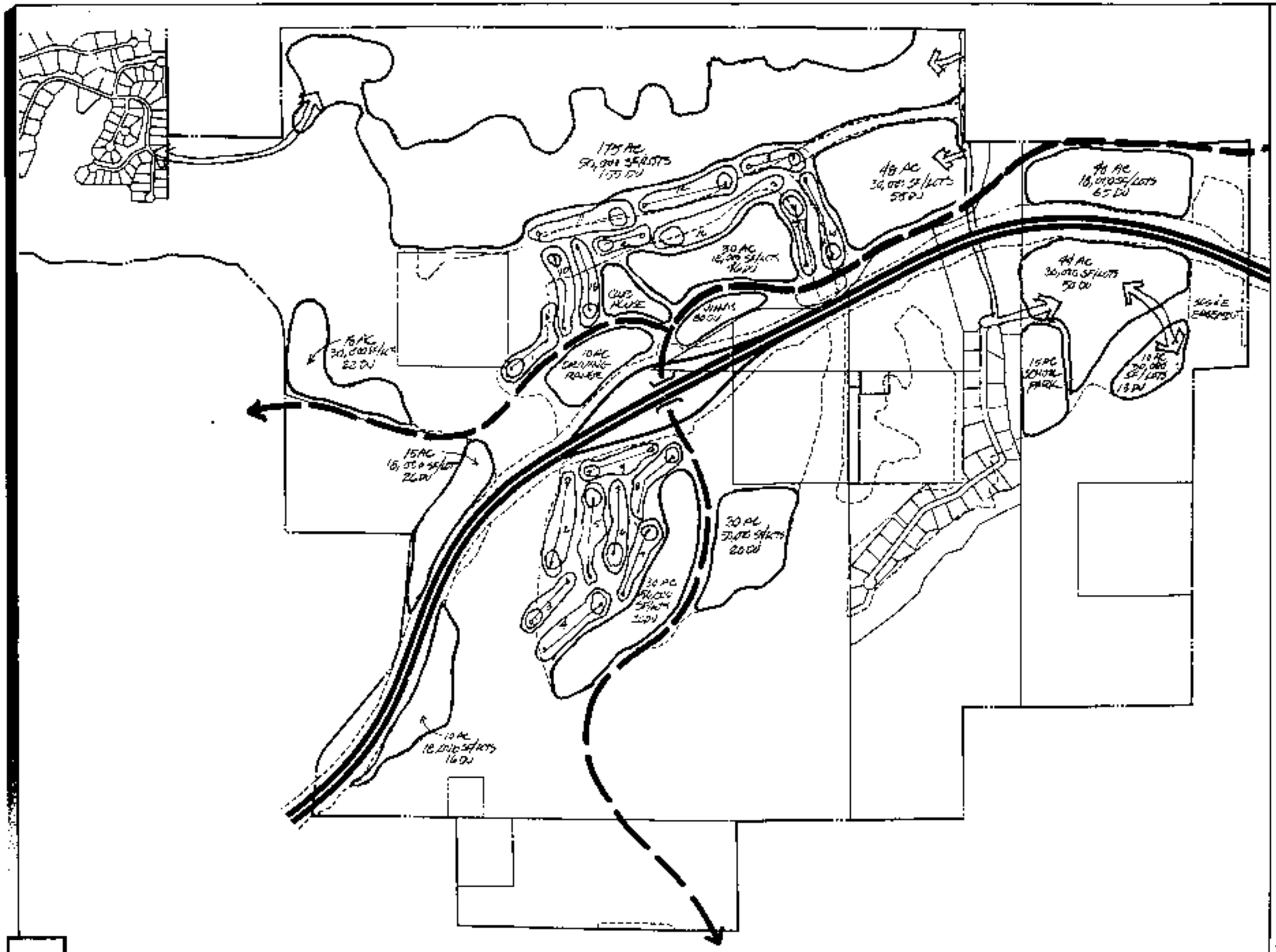


FIGURE 8-4

SR-56 Alignment "D"
Non-phase Shift-
Land Use Plan

2250 1125 FEET 0

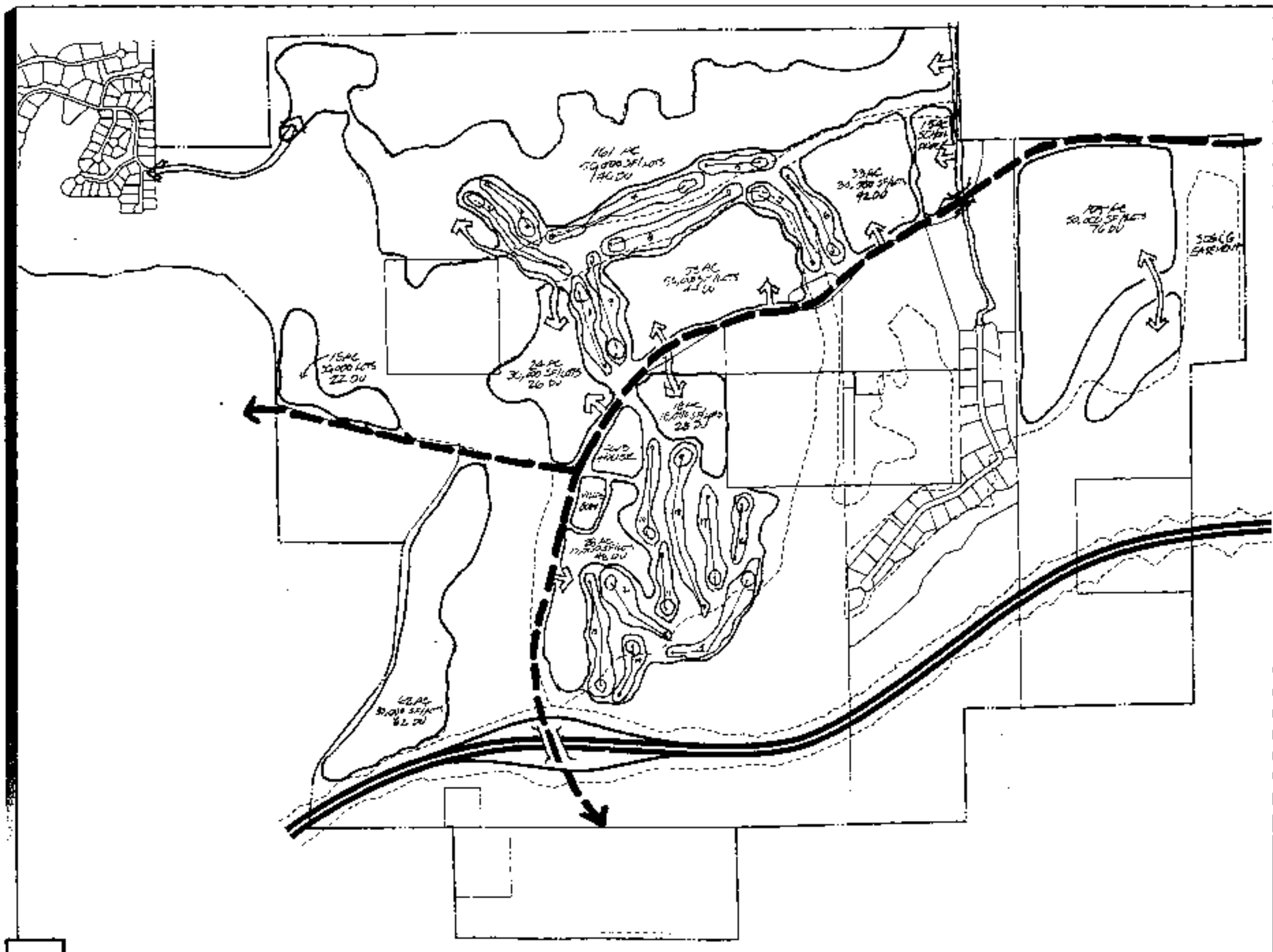


FIGURE 8-5

SR-56 Central Non-phase Shift-Land Use Plan

Each of these alternatives could lessen the significant impacts associated with the two proposed Subarea Plans for Pacific Highlands Ranch. Landform alteration would be substantially reduced with the implementation of this alternative as grading for a golf course in the central portion of the site would be reduced from that necessary for the mixed use core, high school, employment center, and various residential densities. The golf course would also be designed to accommodate the urban amenity. Biologically, the MSCP open space corridor in the northwestern corner of the site would be expanded under this scenario with the elimination of the low-density development area. However, without a phase shift, the MHPA open space as shown in the proposed Subarea Plans 1 and 2 would not be permanently preserved due to the development potential of the remaining A-1-10 ownerships throughout the subarea.

These alternatives would reduce the traffic generation from approximately 55,000-71,010 ADT to approximately 6,660 ADT and the demand on public services and utilities (e.g., police, fire, sewer, water, and schools) would be substantially lessened. Other mitigated impacts of the proposed project, such as impacts to hydrology, cultural resources, geology, paleontology, air quality, noise, and public safety, would be further reduced by implementation of this alternative.

However, development of Pacific Highlands Ranch without a phase shift would have potentially significant land use impacts regarding inconsistencies with the adopted NCFUA Framework Plan. This alternative would not provide the community facilities required in the Framework Plan such as the mixed use core, park and school facilities, and employment center. Also, as noted above, the long-term MSCP preserve regional conservation benefits would not be realized under this alternative.

The major difference among these concept plans is the location of the SR-56 alignment and the grading associated with the alignment. The non-phase shift land use concepts associated with each alignment are briefly summarized below.

1) Non-Phase Shift Plan 1 (SR-56 Alignment "F")

As shown on Figure 8-3, this alignment would extend northeast for approximately 2,000 feet to the Carmel Valley Road culvert, then east for approximately 5,000 feet along the north side of McGonigle Canyon, and then northeast for approximately 6,000 feet within a small canyon that parallels the west side of the existing Rancho Glens Estates subdivision. The future Camino Santa Fe interchange would be located approximately 2,000 feet east of Carmel Valley Road and 1,000 feet north of the confluence of McGonigle and Deer Canyons. A possible second interchange within Subarea III (the third within the proposed middle section of SR-56) could be constructed east if the Rancho Santa Fe Farms Road overcrossing. The total length of this alignment would be 5.6 linear miles.

Plan 1 would locate all but 65 acres of development north of the freeway alignment. A few 30,000-square-foot lots would be located adjacent to the freeway alignment in the western and eastern portion of the site which would require noise attenuation barriers (ranging form 10 to 16 feet in height). By locating the golf course just north of the freeway alignment, noise impacts to the senior high school, community park, and core residential development are eliminated.

2) Non-Phase Shift Plan 2 (SR-56 Alignment "D")

As shown on Figure 8-4, this alignment would extend northeast for approximately 2,000 feet to the Carmel Valley Road culvert, then north for approximately 5,000 feet along the east side of Carmel Valley Road, and then northeast for approximately 6,000 feet along a ridge that parallels the south side of Black Mountain Road. The future Camino Santa Fe interchange would be located approximately 2,000 feet east of the existing Carmel Valley Road/Black Mountain Road intersection. The additional interchange and total length of the alignment would be about the same as under Concept Plan 1.

Concept Plan 2 would locate the freeway alignment in the middle of the development essentially dividing the community. With this concept plan as with the proposed Subarea Plan 2, the freeway location results in impacts to more land uses. Preliminary engineering studies estimate cut-and-fill volumes of about 2.5 million cubic yards. Noise attenuation barriers (ranging from 8 to 16 feet in height) would be required on both sides of the freeway and retaining walls would be constructed in the eastern portion of the alignment on the south side.

3) Non-Phase Shift Plan 3 (SR-56 Central Alignment)

As shown on Figure 8-5, this alignment would begin at the southwest corner of Pacific Highlands Ranch as do the other alternative alignments, but instead of traversing northerly up toward the crest of the canyon, this alignment continues easterly in McGonigle Canyon. Near the intersection of McGonigle and Deer Canyons, the freeway would proceed in a northeast direction along the south-facing slope of Santa Monica Ridge. The freeway leaves Pacific Highlands Ranch in the southeast section adjacent to the Torrey Highlands community (Subarea IV).

Since the central alignment would be separated from the community by open space, there would be a reduction in noise impacts for residential units, schools, and parks, in addition to an incremental reduction in air quality impacts related to freeway traffic (fewer vehicle miles traveled).

F. SR-56 Central Alignment Alternative

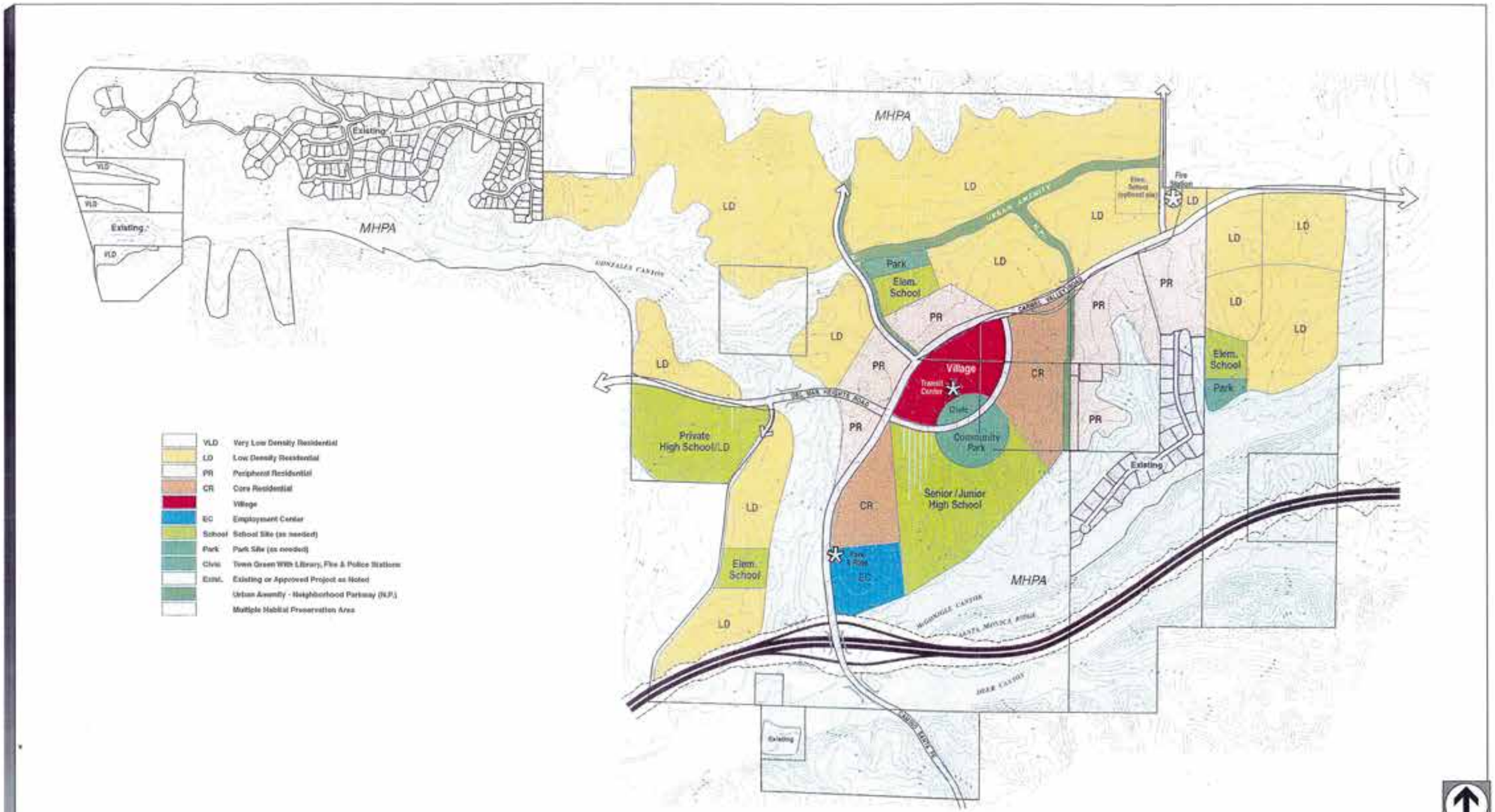
This alternative plan to the two proposed subarea plans is included to address the possible adoption of the central alignment for SR-56. The SR-56 central alignment is the most direct route between the western portion of Carmel Valley and the eastern portion of Rancho Peñasquitos.

This alignment would enter Pacific Highlands Ranch in the southwest corner of the planning area as shown in Figure 8-6. Topographically, this places the freeway in McGonigle Canyon and adjacent to Carmel Creek. However, while the alignment begins at the southwest corner of Pacific Highlands Ranch as do the other alternative alignments, instead of traversing northerly up toward the crest of the canyon, this alignment continues easterly. Near the intersection of McGonigle and Deer Canyons, the freeway would proceed in a northeast direction along the south-facing slope of Santa Monica Ridge within Deer Canyon. The freeway leaves Pacific Highlands Ranch in the southeast section adjacent to the Torrey Highlands community (Subarea IV).

As shown in Figure 8-6, the land use plan for the central alignment alternative is similar to the proposed Subarea Plan 1 with the "F" alignment for SR-56. This alternative would include up to 5,500 residential dwelling units; a Town Center and Village area consisting of commercial uses, retail uses, a community green, high-density residential, and a civic area; an employment center; three elementary schools; two neighborhood parks; a community park; one junior high and two high schools (one private and one public); a public library; a fire station; a police substation; and the associated public facilities and transportation network. The limits of development and grading for the land use plan area only would cover approximately 50 percent of the 2,652-acre subarea. Additional disturbance would be required to construct the freeway south of the developed area.

Comparison of Impacts with the Proposed Subarea Plans 1 and 2

Because the proposed number of dwelling units and types of land uses for this alternative are very similar to those proposed in either Subarea Plan 1 or 2, potential impacts related to the size of the development envelope and numbers of vehicle trips generated are similar. The main difference between this alternative and the two proposed Subarea Plans is the location of the SR-56 alignment. In this alternative the alignment would be located in a sensitive portion of the adopted MHPA but would be separated from the community by open space. Following is a discussion of those environmental issues most affected by the location of the SR-56 alignment. All other potential environmental impacts are considered essentially similar to either of the proposed Subarea Plans.



Map Source: Latitude 33 Planing and Engineering 1998

FIGURE 8-6

Central SR56 Alignment Alternative Land Use Plan

a) Land Use

In both proposed plans, the freeway would divide the community and the adjacent residential, school, and park uses would experience increased noise and air quality impacts associated with the freeway. Since the central alignment would be separated from the community by open space, there would be a reduction in noise impacts for residential units, schools, and parks, in addition to an incremental reduction in air quality impacts related to freeway traffic (fewer vehicle miles traveled).

b) Transportation/Traffic Circulation

Like all of the other alignments, this alternative alignment would accommodate projected interregional traffic and would complete a major planned circulation element in the region. While vastly improving regional mobility, there would still be traffic impacts associated with the general growth of the area, not the construction of the freeway. From a traffic perspective this alignment is not very different from either of the Subarea Plan 1 or 2 proposed alignments. Also, the final configuration to have one or two interchanges in Subarea III has little effect on traffic impacts.

c) Biological Resources

As described in the SR-56 EIR (City of San Diego 1998), adoption of the central alignment would result in significant impacts to biological resources. This alignment would impact a larger portion of sensitive habitat than the other proposed SR-56 alignments because of its location on relatively undisturbed slopes of Deer Canyon. Also, this route would fragment a large portion of the MHPA into 500- and 700-acre portions, compromising the biological integrity of the MHPA. This fragmentation would be a significant unmitigated impact. In addition, this alignment would be a barrier to major wildlife corridors which traverse McGonigle and Deer Canyons. Bridge crossings would be constructed to allow continued wildlife movement.

The central alignment would impact additional areas of sensitive habitat and plants including Diegan coastal sage scrub, scrub oak, chaparral, scrub oak chaparral, southern mixed chaparral, chamise chaparral, non-native grasslands, wetlands, San Diego barrel cactus, and Nuttall's scrub oak. This route would also disturb stands of California adolphia and summer holly. Grading for the alignment would disturb California gnatcatcher territories. Impacts to the above sensitive habitats and species could be mitigated; however, the fragmentation of the MHPA would be a significant and unmitigated impact (City of San Diego 1998). These impacts would not occur under the proposed subarea plans.

d) Landform Alteration/Visual Quality

Like the proposed Subarea Plans 1 and 2, grading for this alternative would impact a minor area of steep slopes, exceed the City's threshold of 2,000 cubic yards of earthwork per acre; and create manufactured slopes greater than 10 feet high. However, this alternative would result in a freeway alignment with more significant contrast to landform than either of the other subarea plans because of the 80-foot-high cut slope face on the highly visible Santa Monica Ridge. This alternative would also introduce an urban feature into a relatively undisturbed canyon environment, albeit with few sensitive viewers. Thus, the visual contrast between this alignment and surrounding environment would be substantially increased from the other alignments under Plans 1 and 2. However, because noise impacts to sensitive receivers would be almost entirely avoided under this alignment, the visual impact associated with the noise walls necessary under Plans 1 and 2 would be reduced under the central alignment.

e) Cultural and Paleontological Resources

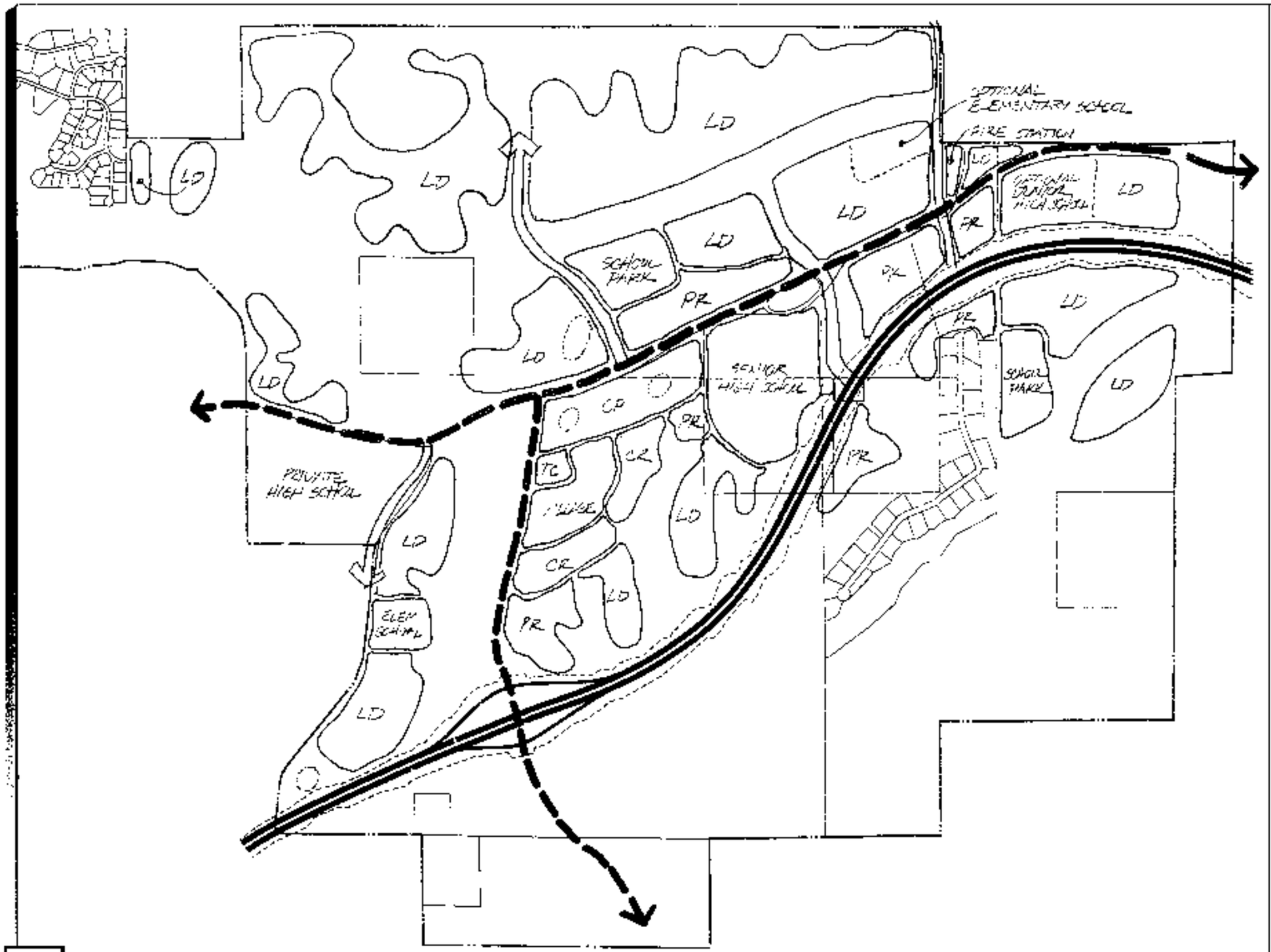
It is assumed that the proposed development envelope for the SR-56 central alignment alternative would impact about the same number of significant cultural resource sites as would either the Subarea Plan 1 or 2. However, according to the City draft EIR, the SR-56 central alignment would impact only one sensitive cultural resource site while the Alternative "D" alignment would affect six sites and the Alternative "F" alignment would affect five sites (City of San Diego 1998). According to the same EIR, the central alignment would impact about 25 fewer acres of geologic formations with some paleontological sensitivity. All of the alternatives may be adequately mitigated for significant cultural resources or paleontological impacts with implementation of a CEQA-approved data recovery program.

G. Resource Protection Ordinance Alternative

The identified land use impact associated with the proposed project's inconsistency with the provisions of RPO would be lessened by a project alternative which strictly complies with the encroachment provisions of RPO. Under this scenario, a project alternative that avoids wetland encroachment and floodways, applies wetland buffers adjacent to all wetlands, reduces the excess steep slope encroachment, and avoids impacts to RPO-significant archaeology sites would reduce the identified land use impact (see Land Use, Chapter 4.A, Issue 2). Aside from the land use implications associated with the Framework Plan goals, this alternative would also lessen the other direct and cumulative impacts associated with the proposed Subarea Plans. It is considered environmentally preferable to the proposed projects.

A conceptual alternative land use plan which incorporates these design revisions is shown in Figure 8-7. Under this conceptual scenario, the number of single-family units would be reduced by approximately 50 percent as the total on-site development area for residential development and the associated transportation network would be substantially reduced.

Other impacts associated with the proposed subarea plans would also be reduced under the RPO alternative. Impacts to native vegetation and landform alteration/visual quality would be reduced under this alternative. However, substantial earthwork would still be required for the grading for the development areas and the SR-56 alignment, and the impacts would remain significant and unmitigated. With the reduction in dwelling units, the project traffic generation would be reduced from 80,000 ADT to approximately 40,000 ADT. Finally, the demand on public services (schools, parks, police and fire service) and utilities (water, sewer, and solid waste) would be lessened under this alternative.



Map Source: Latitude 33 Planning and Engineering 2008

FIGURE 8-7

Conceptual RPO Alternative Land Use Plan

North

2256 1125 FEET 0

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Chapter Eleven
Certification

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Mitigation Mooitoring and Reporting Program
Pacific Highlands Ranch Subarea Plan
LDR No. 96-7918

The California Environmental Quality Act (CEQA). Section 21081.6, requires that a mitigation monitoring and reporting program be adopted upon certification of an environmental impact report (EIR) in order to ensure that the mitigation measures are implemented. The mitigation monitoring and reporting program specifies what the mitigation is, the entity responsible for monitoring the program, and when in the process it should be accomplished.

The mitigation monitorng and reporting program for Pacific Highlands Ranch Subarea III is under the jurisdiction of the City of San Diego and other agencies as specified below. The following is a description of the mitigation monitoring and reporting program to be completed for the project. Tables and figures from the MEIR for the project are referenced in the following text.

1) Land Use

a) **Impact:** ***Subarea Plans 1 and 2.*** Both proposed plans are generally consistent with the intent of the General Plan, environmental goals of the adopted NCFUA Framework Plan, Council Policy 600-40, and the North City LCP. The lack of compliance with the preservation of agricultural lands described in the Framework Plan, and the impacts to the circulation system represents a significant direct and cumulative land use impact.

a) **Mitigation:** ***Subarea Plans 1 and 2.*** The No Project alternative would avoid impacts to the General Plan agricultural lands preservation goal, and the NCFUA circulation system principles.

b) **Impact:** ***Subarea Plans 1 and 2.*** Both subarea plans have been prepared consistent with the requirements of City Council Policy 600-40. However, both plans would not be consistent with the encroachment provision of RPO as they apply to steep slopes, wetlands, and significant prehistoric sites. As such, this would represent a significant direct and cumulative land use impact.

b) **Mitigation:** ***Subarea Plans 1 and 2.*** Although both subarea plans have been designed to minimize impacts to RPO-sensitive resources, strict compliance with the development regulations of the ordinance would require a project redesign. The plans' inconsistency with the RPO encroachment provisions can be avoided with

implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

Land Use Compatibility within Pacific Highlands Ranch

c) **Impact:** ***Subarea Plans 1 and 2.*** The identified potential internal land use compatibility impacts described above in conjunction with the SR-56 alignment are considered potentially significant. As noted above, the significance of this impact is also described in the Revised Draft EIR for the Middle Segment of SR-56. Also, the proposed extension of Carmel Valley Road could result in significant land use incompatibilities with the proposed Pacific Highlands Ranch residential developments along these roadways.

c) **Mitigation:** ***Subarea Plans 1 and 2.*** Mitigation for the potential internal land use compatibility impacts associated with proposed land uses and the SR-56 freeway would consist of the requirement for landscaping and noise attenuation measures at the time tentative maps are processed.

2) Transportation/Traffic Circulation

a) **Impact:** The following impacts are considered both direct and cumulatively significant:

- Development of 41 Phase I units east of the existing Del Mar Heights Estates.
- Project contribution of more than 2 percent traffic to Black Mountain Road/Park Village intersection.
- Additional traffic contribution to Black Mountain Road from SR-56 to Mercy Road (currently failing).
- Project contribution of more than 2 percent traffic to El Camino Real between Via de la Valle and Half Mile Drive (LOS F).
- Project contribution of 7.5 percent traffic to Camino Ruiz North or SR-56 at buildout without the third intersection (LOS E).
- Project contributions to freeway areas where wait already exceeds 15 minutes.
- Project contribution of more than 2 percent traffic to El Apajo from Via Santa Fe to San Dieguito Road.

a) **Mitigation:** Table 4B-14 includes all of the area's transportation improvements necessary to reduce project impacts to the extent feasible; however, not all impacts are reduced to below a significant level. Table 4B-14 includes the location of the

improvement, the type of the improvement, the party responsible for the improvement, and the level of significance after mitigation.

3) Biological Resources

a) Impact:

Subarea Plan 1. The direct, indirect, and cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (13.2 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.4 acres of coastal sage scrub and 0.1 acre of coyote bush scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.4 acre), and impacts to the above-identified sensitive plant and animal species.

Subarea Plan 2. The direct, indirect, cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (12.9 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.0 acres of coastal sage scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.7 acre), and impacts to the above-identified sensitive plant and animal species.

Both Plans. Although both plans would meet the MSCP requirement, cumulative wetland impacts would remain significant.

Carmel Valley Neighborhood 10 Precise Plan. The impacts to coastal sage scrub and non-grasslands would be a significant impact.

a) Mitigation: The significant direct and indirect impacts to upland biological resources would be mitigated to below a level of significance through conformance and implementation of the MSCP. The Pacific Highlands Ranch MSCP impacts and mitigation requirements are shown in Tables 4C-5 and 4C-6. Table 4C-5 shows the mitigation requirements for Plan 1 and Table 4C-6 shows the mitigation requirements for Plan 2. These tables separate the mitigation requirements for the Pardee ownership and the non-Pardee ownerships. The identified mitigation ratios are per the adopted MSCP based on the vegetation type (Tier Designation) being impacted. As these tables indicate, there is adequate acreage on-site to mitigate for Pardee's direct impacts within Pacific Highlands Ranch. There is also adequate acreage within Subarea II to mitigate for the 8.1 acres of impacts into Tier II and Tier IIIA habitats previously designated as open space within Carmel Valley Neighborhood 10 Precise Plan. Other mitigation requirements identified to deal with direct and indirect impacts would be implemented at the time future tentative maps are processed and would include the following:

1. Staking and monitoring of grading activities shall be supervised by a qualified biologist to ensure no unanticipated impacts to sensitive habitats or species occur within the areas shown for permanent open space. This requirement should be noted on the grading plans prior to the issuance of a grading permit.

2. Brush management for Zone 2 shall be implemented as required by the City and shall be the responsibility of the adjacent landowner.

3. Lighting at perimeter lots adjacent to the open space shall be selectively placed, shielded, and directed away from that habitat.

4. Any fencing along property boundaries facing the open space corridors shall be designed and constructed of materials that are compatible with the open space corridors. Fencing shall be installed by the developer prior to the occupancy of the units in order to ensure uniformity. Locations where fencing are required are described in the Subarea Plan.

5. Restrictions for noise impacts on grading of lands adjacent to the MHPA consistent with the MSCP Subarea Plan should be implemented during the gnatcatcher breeding season. Grading inside the MHPA preserve or within 100 feet of the MHPA is prohibited during gnatcatcher breeding season. Grading can occur on land that was previously cleared.

Wetland impacts under both Plan 1 and Plan 2 would be mitigated through the creation/restoration within the Pacific Highland Ranch project site. Portions of the drainage bottoms with Deer Canyon and McGonigle Canyon have been disturbed by agricultural operations and can be utilized to accomplish wetland mitigation requirements on-site. Wetland restoration, at a ratio consistent with the MSCP, is a component in the conceptual revegetation plan prepared in conjunction with the mitigation land bank (see discussion below).

Other mitigation measures provided as extraordinary benefit to the City, negotiated as part of a contemplated development agreement for Subarea III would be the dedication of lands within Subarea V and the Carmel Valley community planning area. At Carmel Valley Neighborhood 8A (Parcels A and B), approximately 75 acres of Tier I habitat would be added to the MHPA. The addition of these lands to the MHPA would greatly increase the size of the habitat block planned for this particular geographic area, improving the overall preserve design and configuration, and providing greater assurances that scarce vegetation types (i.e., southern maritime chaparral) would be maintained over the long term. Additionally, future development potential at the Deer Canyon parcel within Subarea V would be avoided. Finally, Pardee has agreed to other provisions which would further enhance the MHPA function. These measures consist of the following:

1. No brush management activities would be performed within the preserve along the edges of several of the proposed encroachment areas as described in the Subarea Plan. Zone 2 brush management would be allowed in other areas of the MHPA.

2. All manufactured slopes along the edge of the MHPA would be included within the MHPA and would be revegetated in accordance with a Master Revegetation Plan.

3. Impacts to wetlands would be minimized, and mitigation would be per City Ordinance and the U.S. Army Corps of Engineers 404 Permit requirements.

4. Approximately 130 acres of disturbed land within the MHPA for Pacific Highlands Ranch would be restored per a Master Revegetation Plan with appropriate upland and wetland habitats and a mitigation bank established. Much of this revegetation area consists of a manufactured wildlife corridor that would connect and provide for wildlife movement between Gonzales Canyon and McGonigle Canyon.

5. Conveyance of acreage within Carmel Valley Neighborhood 8A and Subarea V (Deer Canyon).

Prior to the issuance of grading permits in conjunction with future tentative map approvals, Development Services shall review the grading and landscape plans for consistency with the mitigation measures for impacts to biological resources (grading and brush management). The above measures would be conditions of future development permits and landscape plans. After completion of grading and prior to the issuance of building permits, a site inspection by City staff would be required to ensure compliance with the brush management mitigation program.

Mitigation Land Banks

In order to effectuate the boundary adjustments to the MHPA, a mitigation bank would be established over approximately 130 acres of land within the Pardee ownership in Pacific Highlands Ranch. The bank will consist of disturbed land that will be revegetated in accordance with the master revegetation plan. Restored habitats will consist of appropriate wetland and upland habitats. It is anticipated that much of the upland habitat would consist of Tier II and Tier III habitats. The City will direct project applicants needing mitigation in the North City area to purchase credits in this bank, and will accept land from this bank into the MHPA upon purchase of credits by a third party. The bank will be processed and approved expeditiously by the City in a manner that will enable establishment costs to be kept to a minimum.

For areas to be restored, a conceptual revegetation summary which outlines the general criteria and maintenance requirements to be included in a more detailed master revegetation plan for Pacific Highlands Ranch is included as Appendix C2 to this EIR.

Restored lands included in the mitigation bank would be maintained as required in the master revegetation plan until credits are sold and the land conveyed to the City for MHPA purposes. Upon conveyance, the City would assume responsibility for management and maintenance.

A mitigation bank covering approximately 24 acres within Parcel A of Carmel Valley Neighborhood 8A would also be established as a component of the MHPA boundary adjustment process.

4) Hydrology

a) Impact: ***Subarea Plans 1 and 2.*** Construction activities in Pacific Highlands Ranch could result in significant erosion, siltation, and water quality impacts. The increase in runoff volume and velocity due to the introduction of streets, roads, and other hardscape surfaces could result in significant adverse erosion, water quality, and flooding impacts to existing natural drainage courses and the Carmel Valley storm drain system. However, these impacts are mitigable to below a level of significance by incorporating the City's BMPs and the standard engineering practices listed below.

a) Mitigation: ***Subarea Plans 1 and 2.*** Incorporation of the following mitigation measures into project design would mitigate potential hydrology/water quality impacts to a level of less than significant. The exact locations and design of these measures will be determined in conjunction with future specific development proposals. As a condition of future tentative map approvals, the following mitigation measures shall be specified on the grading plan:

Short-term Construction Practices

1. As a condition of future VTMs and to be shown as a note on the grading permit, grading and other surface-disturbing activities either shall be planned to avoid the rainy season (i.e., November through March) to reduce potential erosion impacts or shall employ construction phase erosion control measures, including the short-term use of sandbags, matting, mulch, berms, hay bales, or similar devices along all graded areas to minimize sediment transport. The exact design, location, and schedule of use for such devices shall be conducted pursuant to direction and approval by the City Engineer.

2. Prior to the issuance of a grading permit, the grading plan shall locate temporary desilting basins at all discharge points adjacent to drainage courses or where substantial drainage alteration is proposed. The exact design and location of such facilities shall be conducted pursuant to direction by the City Engineer.

3. As condition of future VTMs, the developer shall within 90 days of completion of grading activities, hydroseed landscape graded and common areas with appropriate ground cover vegetation consistent with the biology section mitigation requirements (e.g., use of native or noninvasive plants). These revegetated areas shall be inspected monthly by a qualified biologist until vegetation has been firmly established as determined by the City's grading inspector.

4. Compacted areas shall be scarified, where appropriate, to induce surface water infiltration and revegetation as directed by the project geologist, engineer, and/or biologist.

5. General Construction Activity Storm Water Permits (NPDES No. CAS000002) shall be obtained from the SWRCB prior to project implementation. Such permits are required for specific (or a series of related) construction activities which exceed five acres in size and include provisions to eliminate or reduce off-site discharges through implementation of a SWPPP. Specific SWPPP provisions include requirements for erosion and sediment control, as well as monitoring requirements both during and after construction. Pollution control measures also require the use of best available technology, best conventional pollutant control technology, and/or best management practices to prevent or reduce pollutant discharge (pursuant to SWRCB definitions and direction).

6. A Dewatering Waste Discharge Permit (NPDES No. CA0108804) shall be obtained for the removal and disposal of groundwater (if necessary) encountered during construction. Such permits are intended to ensure compliance with applicable water quality, and beneficial use objectives, and typically entail the use of BMPs to meet these requirements. Discharge under this permit will require compliance with a number of physical, chemical, and thermal parameters (as applicable), along with pertinent site-specific conditions (pursuant to RWQCB direction).

7. Specified vehicle fueling and maintenance procedures and hazardous materials storage areas shall be designated to preclude the discharge of hazardous materials used during construction (e.g., fuels, lubricants and solvents). Such designations shall include specific measures to preclude spills or contain hazardous materials, including proper handling and disposal techniques and use of temporary impervious liners to prevent soil and water contamination.

Project Design

As conditions of future VTMs and to be included as notes and exhibits on the grading plan, the following mitigation measures would be required:

8. Postconstruction erosion control measures shall be implemented where proposed disturbance is adjacent to or encroaches within existing drainage courses and projected runoff velocities exceed 5 cfs.

9. Final project design shall incorporate all applicable BMPs contained in the City and State *Best Management Practices to be Considered in the Development of Urban Stormwater Management Plan*. Specifically, these may include measures such as the use of detention basins, retention structures, infiltration facilities, permeable pavements, vegetation controls, discharge controls, maintenance (e.g., street sweeping), and erosion controls.

10. Surface drainage shall be designed to collect and discharge runoff into natural stream channels or drainage structures. All project-related drainage structures shall be adequately sized to accommodate a minimum 50-year flood event (or other storm events pursuant to direction from the City).

11. Project operation and maintenance practices shall include a schedule for regular maintenance of all private drainage facilities within common development areas to ensure proper working condition. Public facilities shall be maintained by the City.

12. Surface and subsurface drainage shall be designed to preclude ponding outside of designated areas, as well as flow down slopes or over disturbed areas.

13. Runoff diversion facilities (e.g., inlet pipes and brow ditches) shall be used where appropriate to preclude runoff flow down graded slopes.

14. Energy-dissipating structures (e.g., detention ponds, riprap, or drop structures) shall be used at storm drain outlets, drainage crossings, and/or downstream of all culverts, pipe outlets, and brow ditches to reduce velocity and prevent erosion.

15. Long-term maintenance responsibility of the detention basin may be accepted by the City of San Diego or through other acceptable mechanisms (e.g., homeowners' association or assessment district).

The City Engineer shall verify that the precise plan mitigation measures are conditions for the approval of future proposed VTMs. The measures shall be completed prior to issuance of the Certificate of Occupancy.

b) **Impact:** ***Subarea Plans 1 and 2.*** Impacts to the course and flow of floodwaters are mitigable to a level of less than significant through the incorporation of the mitigation measures and BMPs identified previously under Issue 1 (Impact A).

b) **Mitigation:** ***Subarea Plans 1 and 2.*** Impacts to floodwaters would be mitigated to a level of less than significant by incorporating the mitigation measures and BMPs identified for Issue 1 (Impact A) above. All flood control measures shall be reviewed and approved by the City's Transportation and Drainage Design Division of the Public Works Business Center prior to construction.

c) **Impact:** ***Subarea Plans 1 and 2.*** The proposed development of Pacific Highlands Ranch has the potential to significantly impact water quality (both directly and cumulatively) in the San Dieguito River and Lagoon, Carmel Valley, and Los Peñasquitos Lagoon. Specifically, such impacts may be associated with short- and long-term erosion and sedimentation and construction-related contaminant discharge. The proposed project's effects would be less adverse overall than those currently resulting from commercial agricultural activities on-site. The runoff of urban-generated pollutants is not considered significant (on a direct basis) due to the presence of existing regulatory controls and the anticipated incremental nature and extent of such pollutants, though the incremental contribution of urban pollutants would be cumulatively significant.

c) **Mitigation:** ***Subarea Plans 1 and 2.*** Direct impacts to water quality would be mitigated to a level of less than significant by incorporating the mitigation measures identified for Issue 1 above. Current plans call for the construction of desilting basins in the subarea (see Figure 4D-3 for alternative desilting basin locations) to reduce erosion and sedimentation during and after development. The exact number, size, design, and location of desiltation/retention basins will be determined in conjunction with future tentative map proposals. Monitoring and maintenance programs for these facilities would be prepared by future developers and after approval by the City, would be incorporated into the CC&Rs for the developments with these facilities in their common areas.

Implementation of the mitigation measures outlined in Issue 1 would not mitigate fully the associated cumulative effects to water quality in the subarea. These impacts would remain significant and unmitigated. Only the No Project alternative would avoid the potential cumulative impacts to water quality.

5) Landform Alteration/Visual Quality

a) **Impact:** The substantial change in aesthetic character described above would occur under both land use scenarios. This change represents a significant direct and cumulative impact from on- and off-site locations. The development of the project site would incrementally contribute to the change of the aesthetic character of the subregion in conjunction with the existing and planned development in Carmel Valley and Subareas IV and V.

a) **Mitigation:** The preservation of MSCP and urban amenity open space along with implementation of the landscaping concept as future tentative subdivision maps are

processed within Pacific Highlands Ranch and would reduce the identified aesthetic impacts. These measures would not reduce the impacts to below a level of significance. Avoidance of the impact would be accomplished by the No Project alternative.

Specific mitigation measures would be required at the future tentative map stage; specifically, prior to issuance of a grading permit, the Development Services Development Coordinator shall review the grading and landscape plans for consistency with the subarea plan guidelines. Upon completion of the grading for any future tentative map within Pacific Highlands Ranch, and associated off-site conditions, the developer shall submit a letter to Development Services from a qualified consultant certifying that all landscaping for the major manufactured slopes (e.g., roadway slopes) has been implemented. Monitoring shall be required to assure the long-term establishment of the landscaping. The maintenance program shall be effective for a three-year period following the installation of the plantings or until such time as all plantings are established. The long-term monitoring shall establish an inspection schedule, establish replanting specifications, and require written notification once a year to Development Services Department Development Coordinator by the applicant-hired consultant to verify the status of the revegetation.

If the revegetation effort includes the reestablishment of native habitat within or adjacent to the MHPA, a five-year monitoring program would be required. For erosion control or other revegetation outside the MHPA and not part of any biological mitigation, the revegetation plan must conform with the City's Landscape Technical Manual with a monitoring period of 25 months.

b) Impact:

Subarea Plans 1 and 2. Both grading concepts associated with the proposed land use scenarios would require substantial alteration of the topography to develop and access the site. The amount of earthwork anticipated under both Subarea Plans would substantially exceed the City's significance threshold for grading impacts of 2,000 cubic yards per graded acre. The filling of drainages and grading of the broad mesa areas would represent alterations to the existing topography and are considered to be significant direct and cumulative landform alteration impacts.

Carmel Valley Neighborhood 10 Precise Plan. The additional area of grading (canyon fill and associated manufactured slope) within Neighborhood 10 would represent a significant landform alteration impact.

b) Mitigation:

Subarea Plans 1 and Plan 2. Specific mitigation measures which would be required at the future tentative map stage include that prior to issuance of a grading permit,

Development Services shall review the grading plans for consistency with the subarea plan guidelines. These measures include using slope rounding and blending techniques where manufactured slopes meet natural slopes, varying slope gradient and width, and contouring edges to achieve a more natural appearance. Implementation of these measures would reduce the landform alteration impact, but not to below a level of significance. However, only implementation of the No Project alternative would avoid the landform alteration impact. These adverse effects comprise significant and unmitigable direct and cumulative impacts of the proposed project.

Carmel Valley Neighborhood 10 Precise Plan. As described in the previous EIRs for Neighborhood 10 (City of San Diego 1993 and 1997), mitigation for landform alteration impacts include that all manufactured slopes greater than 10 feet in height be contour graded and minimized during the final engineering design. As with the landform alteration impacts associated with the Subarea Plans, these measures would not reduce the impact to below a level of significance. Implementation of the contour grading measures would occur at the time grading permits are approved.

c) **Impact:** ***Subarea Plan 1 and Plan 2.*** Based on the steep slope encroachment analysis prepared for both subarea plans (see Land Use, Chapter 4A, Issue 2), significant impacts are anticipated on canyons, bluffs, or hillsides in Pacific Highlands Ranch.

c) **Mitigation:** ***Subarea Plan 1 and Plan 2.*** Although both subarea plans have been designed to minimize impacts to steep slopes strict compliance with the encroachment thresholds in the development regulations of RPO would require a project redesign. Both plans' inconsistency with the RPO encroachment provisions can be avoided with implementation of the No Project alternative and mitigated to below a level of significance by adoption of a RPO alternative. These alternatives are discussed in Chapter 8 of this EIR.

6) Cultural Resources

a) **Impact:** Twenty-four sites have been found not significant, six sites are in open space areas and should be indexed prior to recording tentative maps for future projects, two sites are in open space and may be potentially significant and require additional evaluation, and one site is located outside of the project boundaries and will require some evaluation when a project is proposed for this property.

The resulting loss of all of the sites on this project is considered a significant cumulative loss of cultural resource information. The destruction of a number of these sites prior to indexing or testing of any kind constitutes a significant impact as important information, which may have been present in these sites, has been lost without record.

There are four sites (CA-SDI-6912, loci B&E, -13,096, -14,003, and -14,562) which have been found to be important/significant resource areas; therefore, impacts to these sites would be considered significant. As presently designed, all of these sites will be destroyed by construction grading. Mitigation of impacts to these sites can be accomplished if they are not found to be significant under the City of San Diego's Resource Protection Ordinance. The current findings for these sites are that they are potentially eligible for nomination to the National Register and are significant under criteria of CEQA. A finding of National Register importance would be viewed as meeting one of the criteria of RPO importance. The State Historic Preservation Officer (SHPO) has not made a finding on the eligibility of these sites as yet. Destruction of a site that is considered to be important under RPO would constitute a significant unmitigated impact. In the event that federal money or federal actions are elements of project development, sites within the project area would be evaluated under Section 106.

a) **Mitigation:** Mitigation, monitoring, and reporting steps are a requirement for any site that is found to be significant and where direct or indirect project impacts cannot be avoided. The devising of a project impact mitigation plan is uniquely tied to the particular resource under consideration. The preferred alternative for any significant or important resource area is avoidance. In the event that avoidance is not feasible, some type of impact mitigation should be completed. The level of work is dependent upon the nature, size, and content of the cultural resource site and upon the types of research that can be accomplished through the recovery and analysis of data from the site.

Resource sites CA-SDI-13091, CA-SDI-13095, CA-SDI-13097, CA-SDI-13099, CA-SDI-13101H, CA-SDI-14001H, CA-SDI-7202, CA-SDI-7204, and CA-SDI-6697/H are avoided by the present construction grading design which places these sites in open space. As specific project plans are proposed some level of site assessment would be required. In the event that these sites will remain in open space the minimal treatment would be the completion of a site indexing which would provide a baseline of information on the deposit content. Indexing would involve the excavation of a minimum of two sample units and a report of findings with updated site record information and recommendations for permanent preservation.

Testing and survey reconnaissance indicate that CA-SDI-13093, CA-SDI-13098, CA-SDI-6914, and CA-SDI-7205 do not contain meaningful information and that additional sampling will not provide the scientific community or public with previously unknown information regarding the prehistoric past. No further work is recommended for these sites.

CA-SDI-14002 (-6916, -6917), CA-SDI-13092, and CA-SDI-6913 are considered potentially significant until fieldwork can be completed to assess their condition and data content. This work is presently being accomplished.

Eight recorded sites were not relocated because they no longer exist. These sites do not require any additional investigation. These sites include CA-SDI-10138, CA-SDI-6701, CA-SDI-6915, CA-SDI-6919, CA-SDI-6920H, CA-SDI-6921, CA-SDI-7201, and CA-SDI-7203. An additional eight sites within the Ranch project area were found to not require any additional investigation as they have previously been determined to be nonsignificant resource areas. These include CA-SDI-10221, CA-SDI-13099, CA-SDI-6696, CA-SDI-6698, CA-SDI-6700, CA-SDI-6911, CA-SDI-6918, and CA-SDI-7206.

7) Air Quality

a) **Impact:** The proposed project would result in significant cumulative air quality impacts under the City's significance thresholds as discussed in Chapter 6 of this EIR.

a) **Mitigation:** No mitigation is available for cumulative air quality impacts at the project level. The project's contribution to cumulative air quality impacts is discussed in Chapter 6, Cumulative Effects. The No Project alternative would avoid potential significant air quality impacts.

8) Geology/Soils/Erosion

a) **Impact:** There are no significant soil or geologic conditions that were observed or known to exist on the project site which would preclude development on the property. However, potentially significant geologic conditions exist which require mitigation, including ancient landslides, expansive soils, unstable cut slopes, alluvial soils, poorly consolidated soils, and ground shaking due to an earthquake.

a) **Mitigation:** For each specific development application in Pacific Highlands Ranch, the City will require the applicant to submit a detailed geotechnical study by a qualified geotechnical firm. The conclusions and implementation of the recommendations provided in these reports would mitigate the potentially significant effects of soil and geologic conditions for future developments in Pacific Highlands Ranch to below a level of significance. The types of mitigation requirements which the feasibility studies are likely to contain are summarized below.

General Measures

1. In areas of proposed development, landslides, improperly compacted fill soil, weak claystone beds, and potentially compressible deposits of alluvium and colluvium may require special attention. Buttresses, stabilizing fill material, or other methods of stabilization will probably be required in developed areas where weak claystone beds or landslides are encountered. In areas where landslides exist off-site, and where stabilization is not feasible, setbacks may be required.

2. The Mission Valley and Friars Formations, and some areas of topsoil, may include highly expansive soil. Based on this review of geologic units on the site, it is anticipated that an adequate quantity of low expansive soil exists on the site to mitigate the adverse impact of expansive soil, when it is encountered.

3. If there are proposed improvements that will be sensitive to potential settlement, partial removal and recompaction of compressible alluvium and colluvium will be necessary.

4. It is anticipated that areas of perched groundwater may exist within low-lying alluvial areas. Subdrains or other remedial measures will be necessary where drainage courses are proposed to be filled.

5. For the purpose of preliminary design, it is recommended that portions of the site that are subject to inundation due to a dam failure upstream be located and considered for restricted usage.

Grading

For the purpose of preliminary design, cut and fill slopes shall be designed no steeper than 2:1. The shear strengths of existing soil and rock units will generally limit safe allowable slope height. The potential impact of geologic conditions on slope stability shall be evaluated in areas of proposed high cut slopes.

Foundations

The dominant soil conditions on the site are generally suitable for supporting conventional spread footings, if the soil is in a dense and undisturbed condition or in a properly compacted condition. The actual soil characteristics and proposed design parameters for structures on the site will determine minimum footing dimensions and requirements for reinforcement. These factors are not currently known; however, it is estimated at this time that spread footings that are designed in accordance with the Uniform Building Code will be designed for an allowable soil bearing pressure of at least 2,000 pounds per square foot.

Drainage and Maintenance

Proper surface drainage shall be provided and maintained, as it is essential to soil stability and to reduce the potential for erosion. Drainage swales shall be installed on graded pads to conduct storm or irrigation runoff to controlled drainage facilities and away from buildings and the tops of slopes. Measures shall be taken to ensure that storm and irrigation water does not flow over the tops of cut or fill slopes.

Consultation and Plan Review

A more comprehensive soil and geologic evaluation shall be performed prior to providing final grading plans for the site. This evaluation shall be required to be implemented as a condition of final maps and grading plans. A geotechnical engineer shall also perform an on-site reconnaissance. A report shall be submitted for review and approval to the City's Engineering and Development Department prior to issuing grading permits.

b) Impact: Future grading activities for the implementation of specific development projects in Pacific Highlands Ranch would result in a potentially significant increase in soil erosion.

b) Mitigation: Prior to approval of a grading permit, each applicant for a specific development project in Pacific Highlands Ranch shall prepare a grading/construction management plan. The following mitigation measures, in addition to those listed in the Hydrology/Water Quality section of this MEIR (Chapter 4.D), shall be incorporated into the plan, if appropriate. The City's Development Services must approve the grading/construction management plans before a grading permit is issued and grading will commence. The geotechnical engineer shall inspect all cut and fill slopes and foundation work. A landscape architect will observe the revegetation of graded slopes. Each of these experts shall submit a report to the City.

1. Areas that have been stripped of native vegetation or areas of fill material shall require particular attention. These areas may require desilting basins, improved surface drainage, or planting of ground covers early in the improvement process, to reduce the potential for erosion.

2. Short-term measures for controlling erosion shall be incorporated into grading plans for the site. These measures shall include sandbag placement and temporary detention basins, as required by the City's Engineering and Development Department.

3. Catch basins shall be provided during grading activities.

4. Grading activities may be restricted during the rainy season, depending on the size of the specific operation. This season typically encompasses November through March. Grading activities may otherwise be restricted by their proximity to sensitive wildlife habitat.

5. After grading, slopes shall be immediately revegetated or hydroseeded with erosion-resistant species. These plants should be carefully irrigated to ensure coverage of the slopes prior to the next rainy season.

6. Measures to control construction sediment shall be implemented in areas near watercourses. These measures may include interim desiltation basins, sandbags, hay bales, or silt fences, which shall be placed at the toe of slopes to prevent erosion. Punch straw or matting shall be installed to stabilize graded slopes and prevent the slope or construction material from sloughing into watercourses.

9) Natural Resources

a) **Impact:** As described in the NCFUA Framework Plan EIR, the direct impacts to prime agricultural resources on the project site from open space preservation and development are considered significant. The incremental loss of land being used for agriculture is also considered a significant cumulative impact and is identified as such in Chapter 6 of this MEIR.

a) **Mitigation:** Only implementation of the No Project alternative would reduce the identified agricultural resources impact associated with potential future development to below a level of significance.

10) Paleontological Resources

a) **Impact:** The potential for significant fossils to occur in the formations of the subarea plan is moderate to high in all areas planned for development of the Pacific Highlands Ranch Plan; therefore, the grading necessary to implement the subarea plan could result in significant impacts to paleontological resources.

a) **Mitigation:** The Pacific Highlands Ranch Plan would require that all future tentative maps and VTMs approved include a condition for the implementation of a monitoring and salvage program for the recovery of paleontological resources during development. This program would reduce potential impacts to paleontological resources to below a level of significance and shall include the following steps:

1. Prior to any grading activities and/or the issuance of permits, the applicant shall provide a letter of verification to the Environmental Review Manager of the Land Development Review Division (LDR) stating that a qualified paleontologist and/or paleontological monitor has been retained to implement the paleontological monitoring program. The requirement for monitoring shall be noted on grading plans. All persons involved in the paleontological monitoring of grading activities shall be approved by LDR.

2. The qualified paleontologist or paleontological monitor shall attend any preconstruction/pregrading meetings to consult with the excavation contractor.

3. The paleontologist or paleontological monitor shall be on-site full time during excavation into previously undisturbed formations. The monitoring time may be decreased at the discretion of the paleontologist in consultation with LDR, depending on the rate of excavation, the materials excavated, and the abundance of fossils.

4. If fossils are encountered, the paleontologist shall have the authority to divert or temporarily halt construction activities in the area of discovery to allow recovery of fossil remains. The paleontologist shall contact LDR at the time of discovery. LDR shall concur with the salvaging methods before construction activities are allowed to resume.

5. The qualified paleontologist shall be responsible for preparation of fossils to a point of identification as defined in the City of San Diego Paleontological Guidelines, and submittal of a letter of acceptance from a local qualified curation facility. The paleontologist shall record any discovered fossil sites at the San Diego Natural History Museum.

6. The qualified paleontologist shall be responsible for the preparation of a monitoring results report with appropriate graphics summarizing the results (even if negative), analyses, and conclusions of the above program. The report shall be submitted to LDR prior to the issuance of building permits and/or certificates of occupancy. If building plans are not required, the paleontologist shall submit the report to LDR within three months following the termination of the monitoring program.

Prior to subarea plan approval, the Development Services Business Center shall verify that the above mitigation measures are incorporated in appropriate sections of the subarea plan. These measures shall be conditions of subsequent tentative maps and VTMs and development proposals.

11) Noise

a) **Impact:** As indicated, noise levels are anticipated to exceed applicable standards for all residential uses immediately adjacent to SR-56 and the major roadways, as well as to proposed school and park uses. Noise levels could exceed 70 CNEL for professional and office building land uses depending on their placement relative to the roadways. Noise levels for commercial retail land uses are not expected to be exceeded unless they are located immediately adjacent to SR-56. Where noise levels exceed applicable exterior standards, noise impacts would be significant.

a) **Mitigation:** Mitigation of noise levels could be accomplished through the construction of noise barriers. However, due to the limited grading detail available at this stage of planning, it is not possible to determine specific barrier heights and locations.

The draft EIR prepared by the City for the middle section of SR-56 indicates that wall heights varying between 12 and 16 feet would be required to mitigate noise levels at existing residential uses (City of San Diego 1996b). Similar wall heights would be anticipated for future sensitive uses located along the SR-56 right-of-way within Pacific Highlands Ranch.

As a general rule of thumb, a barrier provides five decibels of attenuation when it just breaks the line-of-sight between the source and receiver, and adds one decibel of attenuation for each foot above the height required to break the line-of-sight. Therefore, it is anticipated that noise barriers varying from five to eight feet will be required along the other major roadways within Pacific Highlands Ranch where the roadways are located adjacent to sensitive land uses.

At the time that detailed grading plans are available for the future subdivisions within Pacific Highlands Ranch, detailed acoustical analyses shall be performed to determine the exact barrier heights and locations where required. If exterior noise levels within residential areas are found to be above 60 CNEL after mitigation, then detailed interior noise analyses shall be required as well.

12) Public Services/Facilities

a) Impact: Currently, all schools in the Del Mar Union and San Dieguito Union High School Districts are operating above capacity within the project area. The generation of additional elementary school students resulting from development of the proposed project, either under Subarea Plan 1 or Subarea Plan 2 would add to the already overcrowded schools. This is considered a significant direct and cumulative impact.

Currently, there is insufficient capacity at Earl Warren Junior High School to accommodate the additional junior high students generated by buildout of the proposed project, either under Subarea Plan 1 or Subarea Plan 2. This is considered a significant direct and cumulative impact of the project.

Currently, Torrey Pines High School is operating above capacity. The estimated generation of additional high school students would contribute to the overcrowding of the school. This is considered a significant direct and cumulative impact.

Development of the subarea plan would incrementally increase the demand for fire services; however, both subarea plans provide a site for a double fire station. Until the new fire station is operating, the Fire Department's potential inability to provide a maximum six-minute first response time would be considered an interim significant impact.

a) **Mitigation:** The development of the proposed on-site elementary, junior high, and high schools would accomplish mitigation of the project's direct impact to schools from the subarea plan. School facilities financing and mitigation agreements between the affected school districts and the project applicant would be required at the time the Subarea Plan is approved by the City Council to ensure that the impacts on school facilities are mitigated to a level less than significant. In addition, prior to granting a ministerial or discretionary entitlement for a parcel, such parcel shall be subject to the terms of a mitigation agreement entered into by the landowner and the applicable School Districts or included in a community facilities district established by the applicable School Districts and authorized to fund the acquisition of school sites and construction of schools.

Until the new fire station is operating, developers shall demonstrate to the satisfaction of the City Fire Department that a response time of six minutes or less from Fire Station 24 to all portions of new developments can be achieved. For those areas of such new developments where a six-minute response time cannot be provided, individual sprinkler systems or other construction or site design safeguards, approved by the Fire Department, shall be required prior to the issuance of building permits.

b) **Impact:**

Water and Sewer Facilities

Potentially significant impacts to water and sewer facilities are anticipated with the development of the subarea due to a lack of existing facilities to serve the area.

Waste Management Services

The project could generate a significant amount of construction debris during the construction phase. Also, during the ongoing use of the site solid waste generation would exceed the 60 tons/year and 52 tons/year threshold of significance for solid waste impacts for residential and non-residential projects, respectively, established by the City's ESD. The project would affect City waste management programs and services; however, impacts could be minimized by incorporation of recycling and waste reduction measures in project design.

b) **Mitigation:**

Water

Future developers shall be required to provide appropriate water studies consistent with the findings and conclusions of the Miramar 712/North City 610 Water Study. Each developer shall be responsible for installing all those facilities identified in the accepted studies which are necessary to serve their developments. All public water facilities shall

be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

Sewer

Prior to any new development within the subarea, developers shall be required to provide sewer studies showing the proposed sewer system for the subarea. All public sewer facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

Solid Waste

The project's prime contractor in cooperation with the City of San Diego's Environmental Services Department shall develop a comprehensive waste management plan. The plan shall describe programs that would be implemented to reduce the potential for direct and cumulative impacts to the City's waste management services to below a level of significant. The plan shall address construction phase as well as long-term waste management issues. The Development Services shall review this plan to ensure that the ESD has signed the plan and certified that it is consistent with City policy regarding its waste management services.

Following is a list of options that could be considered for the construction phase of the project and specified in the waste management plan:

1. Source separation for all construction debris such as wood, aggregate, drywall, and other discarded products including glass, plastics, and cardboard at the project sites and subsequent recycling of the materials.

2. Buying recycled or using recycled content construction material, such as acoustical ceiling tiles made from newsprint, tiles made from recycled glass, insulation made from mixed paper, as well as many landscaping products such as pavement made from recycled asphalt and tires, and mulch and compost made from green waste.

3. Use of postconsumer aggregate base and mulch in project landscaping;

4. Use of drought-tolerant landscaping to minimize the amount of green waste generated.

Following is a list of options that could be considered to address long-term waste management issues:

1. Provision of each single-family unit with kitchens designed to facilitate recycling;

2. Source separation and recycling of demolition debris;

3. Provision of yard composters designed to encourage backyard composting.

4. Provide devices or chutes in multi-family residential units for convenient separation and recycling of materials.

The project applicant shall develop a solid waste management plan explaining how these options will be incorporated. The plan shall describe the location of exterior and interior storage areas for the collection of recyclables in multi-family residential and non-residential areas as required per Municipal Code Section 101.2001. The project proponent shall ensure the storage areas are located in areas convenient for use by residents or tenants and service providers.

13) Water Conservation

a) Impact: ***Subarea Plans 1 and 2.*** The project's contribution to the cumulative impact associated with water supplies would be reduced to a nominal level by the mitigation measures outlined below.

a) Mitigation:

Subarea Plans 1 and 2. The following mitigation measures shall be incorporated into project design guidelines to address cumulative water usage concerns.

1. Limit grading in areas where no construction is proposed: thereby reducing the need for planting and irrigation of graded areas.

2. Provide lifts of low-clay content soil in landscaped areas to improve infiltration.

3. Reduce runoff potential from landscaped areas by using berming, raised planters, and drip irrigation systems.

4. Install soil moisture override systems in all common irrigation areas to avoid sprinkling when the ground is already saturated.

5. Identify in the plant materials list in the project design guidelines whether or not plants are native or naturalize easily and incorporate a list of local California sources for native plants.

6. Incorporate low-flush toilets, low-flow faucets, and timers on sprinklers (including nighttime watering) into project design.

7. Provide information regarding water conservation measures to new residents at the time of lot purchase.

The Development Services Development Coordinator shall review grading, landscape, and building permits to ensure the above measures have been noted on plans.

14) Public Safety

Vectors

a) **Impact:** Because the proposed project contains on-site detention basins to serve the subarea, the potential for public health and safety impacts to future residents within the project site are considered potentially significant.

a) **Mitigation:** Mitigation measures for potential increased mosquito populations which will decrease potentially significant impacts to below a level of significance are described below. Prior to any grading activities, the applicant shall provide a letter from the County Environmental Health Department Vector Surveillance and Control Division (VSCD) to the environmental review manager of LDR verifying that a vector control program has been designed. Elements of the program may include, but not be limited to the following:

1. The detention basins shall be kept free of debris, high concentrations of nutrients which could contribute to alga blooms, and organic floatage. Any emergent vegetation (e.g., cattails and bulrushes) shall be removed only as necessary to control the mosquito problem.

2. Non-natural runoff to the detention basin shall be minimized by proper drainage patterns to prevent excessive organic material from entering.

3. Although the above measures are designed to minimize the potential for mosquito breeding in the on-site retention basins and control mosquito populations, active control measures may be necessary at times. This would include the application of a mosquito fog or insecticide spray. The use of this measure should be minimized to avoid reducing populations of other insects. Use of spray application shall be minimal and shall require coordination with VSCD, USFWS, and CDFG.

4. Maintenance of the detention basins shall be the responsibility of a homeowners association or similar maintenance district.

Candidate Findings and Statement of Overriding Considerations Regarding the Final Master Environmental Impact Report for Pacific Highlands Ranch (Subarea III)

The following Findings and Statement of Overriding Considerations are made relative to the conclusions of the final Master Environmental Impact Report (final MEIR) for the Pacific Highlands Ranch (Subarea III) Plan (LDR No. 96-7918; SCH No. 97111077).

The Pacific Highlands Ranch Subarea III Plan site is in the North City Future Urbanizing Are (NCFUA). The discretionary actions proposed by the project include a General Plan Amendment, NCFUA Framework Plan Amendment, Subarea Plan, Master Rezone, Multiple Habitat Planning Area (MHPA)Boundary Adjustment, Development Agreement, and Local Coastal Plan Amendment to develop 4,974 residential units (with potential increases up to 5,456 units depending on the need for school facilities and concomitant redesignation of school sites to residential uses); a Town Center with commercial, park open space, residential, and civic area components; elementary, junior high, and high schools; a double fire station; library; and associated public facilities and transportation network on approximately 2,652 acres. Pacific Highlands Ranch is located within the NCFUA, and abuts the northerly limits of Rancho Peñasquitos and Black Mountain Park. Del Mar Mesa (Subarea V) and Carmel Valley are to the south. Subarea IV is to the east, Subarea II is to the west, and Fairbanks Ranch and La Zanja Canyon are to the north. The project includes portions of Del Mar Mesa, McGonigle Canyon, Deer Canyon, Black Mountain Road, and the proposed State Route 56 freeway corridor.

The final MEIR indicates that implementation of the Pacific Highlands Ranch Subarea Plan would ultimately result in unavoidable significant direct and/or cumulative impacts to land use, biological resources (wetlands and native grasslands), traffic, downstream water quality, air quality, landform alteration and visual character, cultural resources, agricultural land, and mineral resources.

The final MEIR indicates that the project's direct and/or cumulative impacts on the following environmental issues can be reduced to less than significant levels through implementation of the Mitigation Monitoring and Reporting Program: transportation and traffic circulation, biological resources (upland species), hydrology/water quality, cultural resources, geology/soils/erosion, paleontological resources, noise, public facilities and services, and public safety.

The final MEIR analyzes the cumulative and growth-inducing impacts of the project, as well as alternatives to the project.

A. Public Resources Code Section 21081(a)

The City Council, having reviewed and considered the information contained in the final EIR for the project and the public record, finds (pursuant to CEQA and the CEQA Guidelines) that changes or alterations have been required in or incorporated into the project which avoid or substantially lessen the significant environmental effects as identified in the final EIR with respect to the areas of traffic circulation, biological resources, hydrology/water quality, cultural resources, geology and soils, paleontology, noise, public facilities and services, water conservation, and public safety, visual quality, geology/soils, paleontology, traffic circulation, air quality, noise, public facilities and services and water conservation.

Mitigation measures which would reduce, but not to below a level of significance, certain impacts to land use, landform alteration, biological resources, and air quality issues have also been incorporated into the project.

No measures are available to fully mitigate the significant direct impacts associated with land use, landform alteration, and biological resources; or the cumulative impacts associated with hydrology/water quality, landform alteration/visual quality, biological resources, and air quality. Only adoption of the No Project alternative or the RPO alternative would avoid or fully mitigate direct impacts and reduce the project's contributions to cumulative impacts to a nominal level. A discussion of the No Project alternative and the RPO alternative are found in Section C of these findings.

Implementation of the following recommendations would occur via the imposition of conditions of approval for the project.

1) Land Use

Impact:

Subarea Plans 1 and 2. The identified potential internal land use compatibility impacts described above in conjunction with the SR-56 alignment are considered potentially significant. The significance of this impact is also described in the Revised Draft EIR for the Middle Segment of SR-56. Also, the proposed extension of Carmel Valley Road could result in significant land use incompatibilities with the proposed Pacific Highlands Ranch residential developments along these roadways.

Finding:

Subarea Plans 1 and 2. Mitigation for the potential internal land use compatibility impacts associated with proposed land uses and the SR-56 freeway would consist of the requirement for landscaping and noise attenuation measures at the time tentative maps are processed.

2) Traffic

Impact: The following impacts are considered both direct and cumulatively significant:

- Development of 41 Phase I units east of the existing Del Mar Heights Estates.
- Project contribution of more than two percent traffic to Black Mountain Road/Park Village intersection.
- Additional traffic contribution to Black Mountain Road from SR-56 to Mercy Road (currently failing).
- Project contribution of more than two percent traffic to El Camino Real between Via de la Valle and Half Mile Drive (LOS F).
- Project contribution of 7.5 percent traffic to Camino Ruiz North or SR-56 at buildout without the third intersection (LOS E).
- Project contributions to freeway areas where wait already exceeds 15 minutes.
- Project contribution of more than 2 percent traffic to El Apajo from Via Santa Fe to San Dieguito Road.

Finding: Table 4B-14 of the draft MEIR includes all of the area's transportation improvements necessary to reduce project impacts to the extent feasible; however, not all impacts are reduced to below a significant level. Table 4B-14 includes the location of the improvement, the type of the improvement, the party responsible for the improvement, and the level of significance after mitigation.

3) Biology

Impact:

Subarea Plan 1. The direct, indirect, and cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (13.2 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.4 acres of coastal sage scrub and 0.1 acre of coyote bush scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.4 acre), and impacts to the above-identified sensitive plant and animal species identified in the MEIR.

Subarea Plan 2. The direct, indirect, and cumulative impacts to sensitive biological resources described above are considered significant. The significant impacts include loss of MSCP Tier I (12.9 acres of southern maritime chaparral and 0.6 acre of native grasslands) and Tier II (10.0 acres of coastal sage scrub) habitats, direct and cumulative loss of riparian scrub wetland habitats (approximately 0.7 acre), and impacts to the above-identified sensitive plant and animal species.

Both Plans. Although both plans would meet the MSCP requirements, cumulative wetland impacts would remain significant.

Carmel Valley Neighborhood 10 Precise Plan. The impacts to coastal sage scrub and non-grasslands would be a significant impact.

Finding: The significant direct and indirect impacts to upland biological resources would be mitigated to below a level of significance through conformance and implementation of the MSCP. The Pacific Highlands Ranch MSCP impacts and mitigation requirements are shown in Tables 4C-5 and 4C-6 of the draft MEIR. Table 4C-5 shows the mitigation requirements for Plan 1 and Table 4C-6 shows the mitigation requirements for Plan 2. These tables separate the mitigation requirements for the Pardee ownership and the non-Pardee ownerships. The identified mitigation ratios are per the adopted MSCP based on the vegetation type (Tier Designation) being impacted. As these tables indicate, there is adequate acreage on-site to mitigate for Pardee's direct impacts within Pacific Highlands Ranch. There is also adequate acreage within Subarea III to mitigate for the 8.1 acres of impacts into Tier II and Tier III habitats previously designated as open space within Carmel Valley Neighborhood 10 Precise Plan.

Other mitigation requirements identified to deal with direct and indirect impacts would be implemented at the time future tentative maps are processed and are included in the MEIR.

Mitigation Land Banks. In order to effectuate the boundary adjustments to the MHPA, a mitigation bank would be established over approximately 100-130 acres of land within the Pardee ownership in Pacific Highlands Ranch. The bank will consist of disturbed land that will be revegetated in accordance with the master revegetation plan. Restored habitats will consist of appropriate wetland and upland habitats. It is anticipated that much of the upland habitat would consist of Tier II and Tier III habitats. The City will direct project applicants needing mitigation in the North City area to purchase credits in this bank, and will accept land from this bank into the MHPA upon purchase of credits by a third party. The bank will be processed and approved expeditiously by the City in a manner that will enable establishment costs to be kept to a minimum.

A mitigation bank covering approximately 24 acres within Parcel A of Carmel Valley Neighborhood 8A would also be established as a component of the MHPA boundary adjustment process.

4) Hydrology

a) Impact:

Subarea Plans 1 and 2. Construction activities in Pacific Highlands Ranch could result in significant erosion, siltation, and water quality impacts. The increase in runoff volume and velocity due to the introduction of streets, roads, and other hardscape surfaces could result in significant adverse erosion, water quality, and flooding impacts to existing natural drainage courses and the Carmel Valley storm drain system. However, these impacts are mitigable to below a level of significance by incorporating the City's BMPs and the standard engineering practices listed below.

a) Finding:

Subarea Plans 1 and 2. Incorporation of the mitigation measures described in the MEIR into project design would mitigate potential hydrology/water quality impacts to a level of less than significant. The exact locations and design of these measures will be determined in conjunction with future specific development proposals. As a condition of future tentative map approvals, appropriate mitigation measures shall be specified on the grading plan

b) Impact:

Subarea Plans 1 and 2. Impacts to the course and flow of floodwaters are mitigable to a level of less than significant through the incorporation of the mitigation measures and BMPs identified previously under Impact A (Issue 1).

b) Finding:

Subarea Plans 1 and 2. Impacts to floodwaters would be mitigated to a level of less than significant by incorporating the mitigation measures and BMPs identified for Impact A (Issue 1) above. All flood control measures shall be reviewed and approved by the City's Transportation and Drainage Design Division of the Public Works Business Center prior to construction.

c) Impact:

Subarea Plans 1 and 2. The proposed development of Pacific Highlands Ranch has the potential to significantly impact water quality (both directly and cumulatively) in the San Dieguito River and Lagoon, Carmel Valley, and Los Peñasquitos Lagoon. Specifically,

such impacts may be associated with short- and long-term erosion and sedimentation and construction related contaminant discharge. The proposed project's effects would be less adverse overall than those currently resulting from commercial agricultural activities on-site. The runoff of urban-generated pollutants is not considered significant (on a direct basis) due to the presence of existing regulatory controls and the anticipated incremental nature and extent of such pollutants, though the incremental contribution of urban pollutants would be cumulatively significant.

c) Finding:

Subarea Plans 1 and 2. Direct impacts to water quality would be mitigated to a level of less than significant by incorporating the mitigation measures identified for Issue 1 above. Current plans call for the construction of desilting basins in the subarea (see Figure 4D-3 for alternative desilting basin locations) to reduce erosion and sedimentation during and after development. The exact number, size, design, and location of desiltation/retention basins will be determined in conjunction with future tentative map proposals. Monitoring and maintenance programs for these facilities would be prepared by future developers and after approval by the City, would be incorporated into the CC&Rs for the developments with these facilities in their common areas.

Implementation of the mitigation measures outlined in Issue 1 would not mitigate fully the associated cumulative effects to water quality in the subarea. These impacts would remain significant and unmitigated. Only the No Project alternative would avoid the potential cumulative impacts to water quality.

5) Landform Alteration/Visual Quality

a) Impact: The substantial change in aesthetic character described above would occur under both land use scenarios. This change represents a significant direct and cumulative impact from on- and off-site locations. The development of the project site would incrementally contribute to the change the aesthetic character of the subregion in conjunction with the existing and planned development in Carmel Valley and Subareas IV and V.

a) Finding: The preservation of MSCP and urban amenity open space along with implementation of the landscaping concept as future tentative subdivision maps are processed within Pacific Highlands Ranch would reduce the identified aesthetic impacts. These measures would not reduce the impacts to below a level of significance. Avoidance of the impact would be accomplished by the No Project alternative.

Specific mitigation measures regarding landscaping would be required at the future tentative map stage; specifically, prior to issuance of a grading permit, the Development

Services Development Coordinator shall review the grading and landscape plans for consistency with the subarea plan guidelines.

b) Impact:

Subarea Plans 1 and 2. Both grading concepts associated with the proposed land use scenarios would require substantial alteration of the topography to develop and access the site. The amount of earthwork anticipated under both Subarea Plans would substantially exceed the City's significance threshold for grading impacts of 2,000 cubic yards per graded acre. The filling of drainages and grading of the broad mesa areas would represent alterations to the existing topography and are considered to be significant direct and cumulative landform alteration impacts.

Carmel Valley Neighborhood 10 Precise Plan. The additional area of grading (canyon fill and associated manufactured slope) within Neighborhood 10 would represent a significant landform alternation impact.

b) Finding:

Subarea Plan 1 and Plan 2. Specific mitigation measures which would be required at the future tentative map stage include that prior to issuance of a grading permit, Development Services shall review the grading plans for consistency with the subarea plan guidelines. These measures include using slope rounding and blending techniques where manufactured slopes meet natural slopes, varying slope gradient and width, and contouring edges to achieve a more natural appearance. Implementation of these measures would reduce the landform alteration impact, but not to below a level of significance. However, only implementation of the No Project alternative would avoid the landform alteration impact. These adverse effects comprise significant and unmitigable direct and cumulative impacts of the proposed project.

Carmel Valley Neighborhood 10 Precise Plan. As described in the previous EIRs for Neighborhood 10 (City of San Diego 1993 and 1997), mitigation for landform alteration impacts include that all manufactured slopes greater than 10 feet in height be contour graded and minimized during the final engineering design. As with the landform alteration impacts associated with the Subarea Plans, these measures would not reduce the impact to below a level of significance. Implementation of the contour grading measures would occur at the time grading permits are approved.

6) Cultural Resources

Impact: Twenty-four sites have been found not significant, six sites are in open space areas and should be indexed prior to recording tentative maps for future projects, two sites are in open space and may be potentially significant and require additional

evaluation, and one site is located outside of the project boundaries and will require some evaluation when a project is proposed for this property.

The resulting loss of all of the sites on this project is considered a significant cumulative loss of cultural resource information. The destruction of a number of these sites prior to indexing or testing of any kind constitutes a significant impact as important information, which may have been present in these sites, has been lost without record.

There are four sites (CA-SDI-6912, loci B&E, -13,096, -14,003, and -14,562) which have been found to be important/significant resource areas; therefore, impacts to these sites would be considered significant. As presently designed, all of these sites will be destroyed by construction grading. Mitigation of impacts to these sites can be accomplished if they are not found to be significant under the City of San Diego's Resource Protection Ordinance. The current findings for these sites are that they are potentially eligible for nomination to the National Register and are significant under criteria of CEQA. A finding of National Register importance would be viewed as meeting one of the criteria of RPO importance. The State Historic Preservation Officer (SHPO) has not made a finding on the eligibility of these sites as yet. Destruction of a site that is considered to be important under RPO would constitute a significant unmitigated impact. In the event that federal money or federal actions are elements of project development, sites within the project area would be evaluated under Section 106.

Finding: Mitigation requirements (i.e., site indexing and data recovery) are included in the MEIR which would provide mitigation for the impacts to significant archaeological sites. The identified level of work is dependent upon the nature, size, and content of the cultural resource site and upon the types of research that can be accomplished through the recovery and analysis of data from the site.

7) Air Quality

Impact: The proposed project would result in significant cumulative air quality impacts under the City's significance thresholds as discussed in Chapter 6 of this EIR.

Finding: No mitigation is available for cumulative air quality impacts at the project level. The project's contribution to cumulative air quality impacts is discussed in Chapter 6, Cumulative Effects.

8) Geology

a) **Impact:** No significant soil or geologic conditions were observed or are known to exist on the project site which would preclude development of the property. However, potentially significant geologic conditions exist which require mitigation, including

ancient landslides, expansive soils, unstable cut slopes, alluvial soils, poorly consolidated soils, and ground shaking due to an earthquake.

a) **Finding:** For each specific development application in Pacific Highlands Ranch, the City will require the applicant to submit a detailed geotechnical study by a qualified geotechnical firm. The conclusions and implementation of the recommendations provided in these reports would mitigate the potentially significant effects of soil and geologic conditions for future developments in Pacific Highlands Ranch to below a level of significance. The types of mitigation requirements which the feasibility studies are likely to contain are addressed in the MEIR.

b) **Impact:** Future grading activities for the implementation of specific development projects in Pacific Highlands Ranch would result in a potentially significant increase in soil erosion.

b) **Finding:** Prior to approval of a grading permit, each applicant for a specific development project in Pacific Highlands Ranch shall prepare a grading/construction management plan. The mitigation measures described in the Hydrology/Water Quality section of the MEIR (Chapter 4.D) and the Geology section of the MEIR.

9) Paleontological Resources

Impact: The potential for significant fossils to occur in the formations of the subarea plan is moderate to high in all areas planned for development of the Pacific Highlands Ranch Plan; therefore, the grading necessary to implement the subarea plan could result in significant impacts to paleontological resources.

Finding: The Pacific Highlands Ranch Plan would require that all future tentative maps and VTMs approved include a condition for the implementation of a monitoring and salvage program for the recovery of paleontological resources during development. This program, as described in the MEIR, would reduce potential impacts to paleontological resources to below a level of significance.

10) Noise

Impact: As indicated, noise levels are anticipated to exceed applicable standards for all residential uses immediately adjacent to SR-56 and the major roadways, as well as to proposed school and park uses. Noise levels could exceed 70 CNEL for professional and office building land uses depending on their placement relative to the roadways. Noise levels for commercial retail land uses are not expected to be exceeded unless they are located immediately adjacent to SR-56. Where noise levels exceed applicable exterior standards, noise impacts would be significant.

Finding: Mitigation of noise levels could be accomplished through the construction of noise barriers. However, due to the limited grading detail available at this stage of planning, it is not possible to determine specific barrier heights and locations. The draft EIR prepared by the City for the middle section of SR-56 indicates that wall heights varying between 12 and 16 feet would be required to mitigate noise levels at existing residential uses (City of San Diego 19966). Similar wall heights would be anticipated for future sensitive uses located along the SR-56 right-of-way within Pacific Highlands Ranch.

It is anticipated that noise barriers varying from five to eight feet will be required along the other major roadways within Pacific Highlands Ranch where the roadways are located adjacent to sensitive land uses.

At the time that detailed grading plans are available for the future subdivisions within Pacific Highlands Ranch, detailed acoustical analyses shall be performed to determine the exact barrier heights and locations where required. If exterior noise levels within residential areas are found to be above 60 CNEL after mitigation, then detailed interior noise analyses shall be required as well.

11) Public Services/Facilities

a) **Impact:** Currently, all schools in the Del Mar Union and San Dieguito Union High school districts are operating above capacity within the project area. The generation of additional elementary, junior high, and high school students resulting from development of the proposed project, either under Subarea Plan 1 or Subarea Plan 2, would add to the already overcrowded schools. This is considered a significant direct and cumulative impact.

Currently, there is insufficient capacity at Earl Warren Junior High School to accommodate the additional junior high students generated by buildout of the proposed project, either under Subarea Plan 1 or Subarea Plan 2. This is considered a significant direct and cumulative impact of the project.

Currently, Torrey Pines High School is operating above capacity. The estimated generation of additional high school students would contribute to the overcrowding of the school. This is considered a significant direct and cumulative impact.

Development of the subarea plan would incrementally increase the demand for fire services; however, both subarea plans provide a site for a double fire station. Until the new fire station is operating, the Fire Department's potential inability to provide a maximum six-minute first response time would be considered an interim significant impact.

a) **Finding:** The development of the proposed on site elementary, junior high, and high schools would accomplish mitigation of the project's direct impact to schools from the subarea plan. School facilities financing and mitigation agreements between the affected school districts and the project applicant would be required at the time the Subarea Plan is approved by the City Council to ensure that the impacts on school facilities are mitigated to a level less than significant. In addition, prior to granting a ministerial or discretionary entitlement for a parcel, such parcel shall be subject to the terms of a mitigation agreement entered into by the landowner and the applicable School Districts or included in a community facilities district established by the applicable School Districts and authorized to fund the acquisition of school sites and construction of schools.

Until the new fire station is operating, developers shall demonstrate to the satisfaction of the City Fire Department that a response time of six minutes or less from Fire Station 24 to all portions of new developments can be achieved. For those areas of such new developments where a six-minute response time cannot be provided, individual sprinkler systems or other construction or site design safeguards, approved by the Fire Department, shall be required prior to the issuance of building permits.

b) **Impact:**

Water and Sewer Facilities. Potentially significant impacts to water and sewer facilities are anticipated with the development of the subarea due to a lack of existing facilities to serve the area.

Waste Management Services. The project could generate a significant amount of construction debris during the construction phase. Also, during the ongoing use of the site solid waste generation would exceed the 60 tons/year and 52 tons/year threshold of significance for solid waste impacts for residential and non-residential projects, respectively, established by the City's ESD. The project would affect City waste management programs and services; however, impacts could be minimized by incorporation of recycling and waste reduction measures in project design.

b) **Finding:**

Water. Future developers shall be required to provide appropriate water studies consistent with the findings and conclusions of the Miramar 712/North City 610 Water Study. Each developer shall be responsible for installing all those facilities identified in the accepted studies which are necessary to serve their developments. All public water facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

Sewer. Prior to any new development within the subarea, developers shall be required to provide sewer studies showing the proposed sewer system for the subarea. All public

sewer facilities shall be designed and constructed according to the most current edition of the City of San Diego Water and Sewer Design Guide.

Solid Waste. The project's prime contractor in cooperation with the City of San Diego's Environmental Services Department shall develop a comprehensive waste management plan. The plan shall describe programs that would be implemented to reduce the potential for direct and cumulative impacts to the City's waste management services to below a level of significant. The plan shall address construction phase as well as long-term waste management issues. The Development Services shall review this plan to ensure that the ESD has signed the plan and certified that it is consistent with City policy regarding its waste management services.

12) Water Conservation

Impact: The project's contribution to the cumulative impact associated with water supplies would be reduced to a nominal level by the mitigation measures outlined below.

Finding:

Subarea Plans 1 and 2. The water conservation measures described in the MEIR would be required to address cumulative water usage concerns.

13) Public Safety

Impact: The proposed project contains on-site detention basins to serve the subarea: therefore, potential public health and safety impacts to future residents within the project site are considered potentially significant.

Finding: Mitigation measures for potential increased mosquito populations which will decrease potentially significant impacts to below a level of significance are in the MEIR.

B. Public Resources Code Section 21081(b)

The City Council, having reviewed and considered the information contained in the final MEIR for the project and the public record, finds there are changes or alterations to the project which avoid or substantially lessen the significant environmental impacts that are within the responsibility and jurisdiction of another public agency. These changes are included in the project in order to satisfy the requirements of the federal Clean Water Act Section 404 permit and a Streambed alteration Permit issued under Section 1600 of the California Fish and Game Code.

Prior to the issuance of a grading permit for the project, the applicant shall have received a federal Clean Water Act Section 404 permit and an agreement under Section 1600 of the Fish and Game Code which will be required for alterations to streambeds and for

filling in the mule fat scrub vegetation. The applicant shall demonstrate compliance with mitigation conditions to the satisfaction of the permitting agencies.

C. Public Resources Code Section 21081(c)

The City Council, having reviewed and considered the information contained in the final EIR for the project and the public record, finds there are specific economic, legal, social, and other considerations, which make infeasible additional mitigation measures and project alternatives identified in the MEIR.

1. No Project Alternative

The No Project alternative typically implies no development of the project site. This approach would result in the retention of the property in its present condition (i.e., open space and agricultural lands). As a result, the impacts relating to biological resources, landform alteration/visual quality, agricultural resources, cultural resources, public facilities and services, air quality, noise, and cumulative contribution to traffic congestion associated with the proposed Plans 1 and 2 for Pacific Highlands Ranch would be eliminated.

This alternative would not achieve the goals and objectives of the subarea plan and the adopted Framework Plan. The Framework Plan objectives of providing housing, facilities benefit assessment fees, and roads would not be achieved. In addition, the permanent contributions provided by the proposed subarea plans to the MSCP preserve would be eliminated.

This alternative is infeasible for the following reasons:

a. This alternative would not achieve the open space goals of the proposed Subarea Plans. Specifically, the MSCP goals and MHPA boundary establishment associated with the proposed Pacific Highlands Ranch project would not occur and no substantial open space preservation would result from the No Project alternative.

b. This alternative conflicts with the affordable housing goals of the *Progress Guide and General Plan*, which recommends that housing be provided for all income groups. Housing costs in the Future Urbanizing Area would be too high for employees in nearby job sites.

c. This alternative provides little or no support for public transit, conflicting with the adopted General Plan transit goals and the Land Guidance study being prepared by the City.

d. Retention of the project site in its existing state as primarily agricultural fields would be inconsistent with the approved Framework Plan designations for the site. This alternative would not take advantage of the opportunity to contribute dedicated open space to the MSCP and would not provide the housing opportunities envisioned in the NCFUA Framework Plan. In addition, key subregional traffic routes established in the Framework Plan and Subarea Plan would not be implemented.

e. The City and County would receive much lower long-term revenues in the form of property and sales tax, resulting from the non-development of residential and commercial land use acreage.

2. Alternate Site Design - Plan 1

A conceptual alternative site design for Pacific Highlands Ranch Plan 1 (see Figure 8-1 of the draft MEIR) has been developed by the City of San Diego which, with the exception of the shown alignment of SR-56, more closely adheres to the land use concept described in the adopted NCFUA Framework Plan (see Figure 4A-1 of the draft MEIR). Like the proposed project, this alternative design for Plan 1 includes a similar number of dwelling units, a town center village area consisting of commercial uses, community park, various residential densities, and a civic area: a high school, a fire station; and the associated public facilities and transportation network. The site design also includes a junior high school, but does not include an elementary school or neighborhood park. The opportunity for a private high school would be eliminated. In addition, the alternative design includes moderately low residential densities which are not included it the proposed Plan 1.

Other differences affect the high school, which would be shifted away from the Town Center Village to a location further east and north of Carmel Valley Road. The community park and very low-density residential would also be different locations, and an employment center would not be a component of the alternate plan. Residential development would also be extended south of SR-56 near the western boundary, which is shown as MHPA open space in the proposed Plan 1. However, as with the proposed Plan 1, the limits of development and grading would cover approximately 50 percent of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 of the draft MEIR details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

The differences in environmental impacts between these plans are minimal and the significance of project-related impacts would not be substantially affected. However, the open space design under this alternative, while similar to Plan 1, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP for Subarea III.

This alternative is infeasible for the following reasons:

a. This alternative site design would result in significant impacts on public facilities and services regarding the provision of schools within the Subarea. As described in the MEIR, this alternate land use concept would not provide for any of the elementary schools shown in the proposed Subarea Plans, resulting in significant and unmitigated schools impacts. In addition, the public high school would be located away from the Village area providing less integration of the land uses from a land use planning perspective.

b. This alternative site design would not allow the MSCP open space goals incorporated into the proposed Subarea Plan to be achieved. Specifically, the refined MHPA boundary shown in the proposed Subarea Plan (see Figure 3-7 in the draft MEIR) along with MHPA boundary expansions at other significant MSCP Biological Core Areas (e.g., Carmel Valley Neighborhood 8A) owned by the project applicant would not be achieved under this alternative. As such, implementation of the alternate project design is not considered feasible as it would not implement the agreed-upon long-term conservation planning standpoint associated with the proposed project.

3. Alternate Site Design - Plan 2

A conceptual alternative site design for Pacific Highlands Ranch Plan 2 (Figure 8-2 of the draft MEIR) has also been developed by the City of San Diego reflecting SR-56 Alignment "D." Like the proposed project, this alternative design for Plan 2 includes a similar number of dwelling units, a town center village area consisting of commercial uses, community park, high-density residential, and a civic area; an employment center; a high school, a fire station; and the associated public facilities and transportation network. The alternate site design also includes a junior high school, but does not include an elementary school or neighborhood park. The opportunity for a private high school would be eliminated. In addition, the alternative design includes moderately low residential densities which are not included it the proposed Plan 2.

Other differences between the proposed Plan 2 and the alternate site design prepared by the City include the shifting of the high school away from the Town Center Village to a location further east and north of Carmel Valley Road. The Town Center Village would be bisected by Camino Santa Fe under this design, and the acreage shown for the employment center and specialized commercial uses would be substantially increased along the north side of the SR-56 corridor. The limits of development and grading would cover approximately 50 percent of the subarea. The remaining 50 percent of the site would comprise the MHPA. Table 8-1 of the MEIR details the acreages for the proposed land uses and shows that the MHPA acreage would be increased in size under this alternative.

The differences in environmental impacts between these plans are minimal and the significance of project-related impacts would not be substantially affected. However, the open space design under this alternative, while similar to Plan 2, would differ from the open space under the proposed plan which reflects the refinements as shown in the MSCP for Subarea III.

This alternative is infeasible for the following reasons:

a. This alternative site design would result in significant impacts on public facilities and services regarding the provision of schools within the Subarea. As described in the MEIR, this alternate land use concept would not provide for any of the elementary schools shown in the proposed Subarea Plans, resulting in significant and unmitigated schools impacts. In addition, the public high school would be located away from the Village area providing less integration of the land uses from a land use planning perspective.

b. This alternative site design would not allow the MSCP open space goals incorporated into the proposed Subarea Plan to be achieved. Specifically, the refined MHPA boundary shown in the proposed Subarea Plan (see Figure 3-7 in the draft MEIR) along with MHPA boundary expansions at other significant MSCP Biological Core Areas (e.g., Carmel Valley Neighborhood 8A) owned by the project applicant would not be achieved under this alternative. As such, implementation of the alternate project design is not considered feasible as it would not implement the agreed-upon long-term conservation planning standpoint associated with the proposed project.

4. Development without a Phase Shift

The project site could also be developed pursuant to the underlying A-1-10 zoning without a phase shift from Future Urbanizing to Planned Urbanizing. One scenario, which could be applied to the project site under the Framework Plan pursuant to Council Policy 600-29 and the Planned Residential Development regulations, is development at one dwelling unit per four acres.

A concept plan of a one dwelling unit per four acres with a PRD has been prepared for the Pardee ownership within Pacific Highlands Ranch using three of the SR-56 alignments: (1) Plan 1 Alignment "F"; (2) Plan 2 Alignment "D"; and (3) the central alignment. Each concept plan is shown in Figures 8-3, 8-4, and 8-5 of the draft MEIR, respectively.

For each of these concepts, this alternative would result in approximately 568 dwelling units, a golf course, driving range, clubhouse, and School Park. The total development envelope for the Pardee ownership would occur on approximately 689 acres of the total 1,665-acre Pardee ownership. The residential units would include 416 market rate units

on lot sizes varying from 18,000 square feet to 50,000 square feet and 83 affordable housing units at a density of 20 units per acre. The remaining 855 Pardee acres would remain undeveloped, and as stated in Council Policy 600-29, no future development rights would remain with the property. Each of the other ownerships within Pacific Highlands Ranch (approximately 517 acres) could be developed pursuant to the underlying A-1-10 zoning (one dwelling unit per 10 acres) resulting in approximately 52 additional units for a total of approximately 551 units.

Each of these alternatives could lessen the significant impacts associated with the two proposed Subarea Plans for Pacific Highlands Ranch. Landform alteration would be substantially reduced with the implementation of this alternative as grading for a golf course in the central portion of the site would be reduced from that necessary for the town center village, high school, employment center, and various residential densities. The golf course would also be designed to accommodate the urban amenity. Biologically, the MSCP open space corridor in the northwestern corner of the site would be expanded under this scenario with the elimination of the low-density development area.

These alternatives would reduce the traffic generation from approximately 55,000-71,010 ADT to approximately 6,660 ADT and the demand on public services and utilities (e.g., police, fire, sewer, water, and schools) would be substantially lessened. Other mitigated impacts of the proposed project, such as impacts to hydrology, cultural resources, geology, paleontology, air quality, noise, and public safety would be further reduced by implementation of this alternative.

This alternative is infeasible for the following reasons:

a. This alternative would not achieve the open space goals of the subarea plan. Specifically, the MSCP goals and MHPA establishment associated with the proposed Pacific Highlands Ranch would not occur and no substantial open space preservation would result from the Development without a Phase Shift alternative. Without a phase shift, the MHPA open space and mitigation land banks as shown in the proposed Subarea Plans 1 and 2 and Carmel Valley Neighborhood 8A would not be permanently preserved due to the development potential of the remaining A-1-10 ownerships throughout the subarea.

b. This alternative would not include the preparation of a financing plan for public facilities, likely resulting in public facility shortages within the planning area, and therefore, facilities impacts to adjacent communities. This would conflict with established City policy that public facilities are provided with development in accordance with the need for facilities generated by development.

c. This alternative conflicts with the affordable housing goals of the *Progress Guide and General Plan*, which recommends that housing be provided for all income groups.

Housing costs in the Future Urbanizing Area would be too high for employees in nearby job sites.

d. This alternative provides little or no support for public transit. The promotion of alternative modes of transportation, including pedestrian, equestrian, bicycle, and mass transit would not occur under this alternative. Buildout of Subarea II under this alternative would likely result in piecemeal, non-cohesive development leading to a land use pattern that may not efficiently support public facilities and services.

e. Development of Pacific Highlands Ranch without a phase shift would have significant land use impacts regarding inconsistencies with the adopted NCFUA Framework Plan. This alternative would not provide the community facilities required in the Framework Plan such as the town center village, park and school facilities, and employment center.

5. SR-56 Central Alignment Alternative

This alternative plan to the two proposed subarea plans is included to address the possible adoption of the central alignment for SR-56. The SR-56 central alignment is the most direct route between the western portion of Carmel Valley and the eastern portion of Rancho Peñasquitos.

This alignment would enter Pacific Highlands Ranch in the southwest corner of the planning area as shown in Figure 8-6 of the draft MEIR. Topographically, this places the freeway in McGonigle Canyon and adjacent to Carmel Creek. However, while the alignment begins at the southwest corner of Pacific Highlands Ranch as do the other alternative alignments, instead of traversing northerly up toward the crest of the canyon, this alignment continues easterly. Near the intersection of McGonigle and Deer Canyons, the freeway would proceed in a northeast direction along the south-facing slope of Santa Monica Ridge within Deer Canyon. The freeway leaves Pacific Highlands Ranch in the southeast section adjacent to the Torrey Highlands community (Subarea IV).

The land use plan for the central alignment alternative is similar to the proposed Subarea Plan I with the "F" alignment for SR-56. This alternative would include up to 5,500 residential dwelling units; a Town Center and Village area consisting of commercial uses, retail uses, a community green, high-density residential, and a civic area; an employment center; three elementary schools; two neighborhood parks; a community park; one junior high and two high schools (one private and one public); a public library; a fire station; and the associated public facilities and transportation network. The limits of development and grading for the land use plan area only would cover approximately 50 percent of the 2,652-acre subarea. Additional disturbance would be required to construct the freeway south of the developed area.

This alternative is infeasible for the following reasons:

Implementation of the SR-56 Central Alignment and accompanying land use plan would not allow the City's MSCP open space goals to be achieved which have been incorporated into the Subarea Plan. Specifically, the USFWS has indicated in letters of comment on the draft MEIR for Subarea III (May 18,1998) and the SR-56 Revised EIR (March 9, 1998) that the Central Alignment would violate the agreements for the City's MSCP Subarea Plan and cause significant unmitigable impacts to biological resources. As such, implementation of the Central Alignment for SR-56 is not considered feasible from a long-term conservation planning standpoint.

6. Resource Protection Ordinance Alternative

The identified land use impact associated with the proposed project's inconsistency with the provisions of RPO would be lessened by a project alternative, which strictly complies with the encroachment provisions of RPO. Under this scenario, a project alternative that avoids wetland encroachment and floodways, applies wetland buffers adjacent to all wetlands, reduces the excess steep slope encroachment, and avoids impacts to RPO-significant archaeology sites would reduce the identified land use impact (see Land Use, Chapter 4.A, Issue 2). Aside from the land use implications associated with the Framework Plan goals, this alternative would also lessen the other direct and cumulative impacts associated with the proposed Subarea Plans. It is considered environmentally preferable to the proposed projects.

A conceptual alternative land use plan, which incorporates these design revisions, is shown in Figure 8-7 of the draft MEIR. Under this conceptual scenario, the number of single-family units would be reduced by approximately 50 percent as the total on-site development area for residential development and the associated transportation network would be substantially reduced.

Other impacts associated with the proposed subarea plans would also be reduced under the RPO alternative. Impacts to native vegetation and landform alteration/visual quality would be reduced under this alternative. However, substantial earthwork would still be required for the grading for the development areas and the SR-56 alignment, and the impacts would remain significant and unmitigated. With the reduction in dwelling units, the project traffic generation would be reduced from 80,000 ADT to approximately 40,000 ADT. Finally, the demand on public services (schools, parks, police, and fire service) and utilities (water, sewer, and solid waste) would be lessened under this alternative.

This alternative is infeasible for the following reasons:

a. The RPO alternative would represent a substantial decrease in the number of residential dwelling units and affect the diversity of residential housing. The goals and objectives of the NCFUA Framework Plan include providing housing within the community, promoting a balanced community in terms of housing types and economic appeal, and providing housing to accommodate people employed in the nearby business and industrial parks. Accordingly, this alternative would not fully implement these goals and objectives. The substantial reduction in housing results in a failure to provide housing and indirectly promotes an unbalanced mix of housing type.

b. This alternative would also result in losses of the dedications and financial participation in regional public facilities, and a reduction in tax base revenues to the City. The loss of approximately 50 percent of the housing units would significantly affect the tax increment per year. The reduction of units under this alternative would also result in the loss of dwelling units contributing to the PFFP.

c. Implementation of this alternative would also affect any financing mechanism for providing adequate public facilities because this alternative results in approximately 50 percent fewer units than provided by the proposed project. Without the project's substantial financial contribution for these public improvements as envisioned in the NCFUA Framework Plan, such facilities would experience a dramatic shortfall in revenue for their construction.

d. This alternative would not achieve the open space goals of the subarea plan. Specifically, the MSCP goals and MHPA establishment associated with the proposed Pacific Highlands Ranch Subarea Plans would not occur. Without a phase shift in conjunction with the proposed project, the MHPA open space and mitigation land banks as shown in the proposed Subarea Plans 1 and 2 and Carmel Valley Neighborhood 8A would not occur.

STATEMENT OF OVERRIDING CONSIDERATIONS FOR THE PROPOSED SUBAREA III PACIFIC HIGHLANDS RANCH– SUBAREA PLAN

The City Council, pursuant to State CEQA Guidelines Section 15093, having balanced the benefits of the project against its unavoidable significant direct and/or cumulative impacts of the project on land use, transportation/circulation, biological resources (wetlands and native grasslands), water quality, air quality, landform alteration and visual quality, cultural resources, and natural resources determines that the impacts are acceptable for the following reasons:

1. The project would place approximately 1,280 acres in open space for the benefit of residents, the public, and wildlife. The proposed designation of the open space, and substantial reduction of development potential within this open space, would provide a more effective regional open space system than would continued development in accordance with existing regulations. This open space preserve would provide habitat areas consistent with the MSCP, in addition to a system of wildlife corridors between Gonzales, McGonigle, and Deer Canyons, Santa Monica Ridge, and the rest of the MSCP preserve system. The steep north-facing slopes above La Zanja Canyon and the San Dieguito River valley along the northern boundary of the subarea would also be part of the natural open space system. This open space preserve area encompasses one of the few remaining natural open space areas in San Diego County which is still linked to intact natural open space areas both to the east and west, hence, its tremendous significance.

2. Provided the voters approve a phase shift for the project in November 1998, the project applicant has agreed to transfer title of Parcels A and B within Carmel Valley Neighborhood 8A to the City of San Diego, exclusive of those areas utilized for a 24-acre mitigation land bank. The entirety of these parcels consists of very high quality coastal sage scrub vegetation and southern maritime chaparral with numerous sensitive plant and animal species and is an integral component of the adopted MSCP as a part of the Carmel Mountain biological core area. The City of San Diego considers Parcels A and B within Neighborhood 8A to be a critical component of the MHPA in the North City area.

3. The project would contribute to the successful implementation of the MHPA through the conveyance of lands as open space within Subarea III. These lands include approximately 100- to 130-acre mitigation land bank on Subarea III, which would be restored to Tier I or other appropriate habitat.

4. The approval of this project will result in an increased generation of real property tax revenue for the City of San Diego. The City would receive real property tax increment revenues attributable to the increased value of improved real property associated with the 4,974 dwelling units for the project. Based on the assessed value of the land with implementation of the proposed improvements and a standard tax rate of 1.25 percent, total property tax for the proposed units (assuming an average valuation of $350,000 per dwelling unit) would be approximately $21,750,000 per tax year. A portion of these property taxes would be paid to the City. It should be noted that the estimated real estate values and the tax rate used to calculate the property tax are subject to change as individual phases of the project are implemented.

5. Provided the voters approve a phase shift for the project in November 1998, Pardee will forego receipt of payment in excess of $6,000,000 for the dedication of the SR-56 right-of-way upon the Pardee ownership within Subarea III.

6. The Pacific Highlands Ranch Subarea Plan will provide for significant community-wide public facilities. As the plan is implemented, it will be responsible for constructing on-site a significant portion of the public facilities and infrastructure required to serve the subregion. These facilities include:

   a) A library within the civic use area which serves the entire NCFUA.

   b) Parts of the regional backbone circulation system, including Carmel Valley Road as a four-lane major from the southernmost project access road off-site to Shaw Ridge Road, and the extension of Camino Santa Fe to the south.

   c) Schools serving the subregion including three elementary schools, a junior high, and a public and possibly a private high school.

   d) A 20-acre community park.

   e) A fire station which will provide service to the region and also wildland fire capability.

7. The project implements the land use designations of the adopted Framework Plan and provides a mix of land uses that provides housing opportunities, jobs, and public facilities in the North City area of the city. The proposed plan also encourages the use of alternative modes of transportation through the provision of transit facilities and the inclusion of bicycle and pedestrian network, and it provides commercial and civic facilities in the Town Center to meet daily needs of area residents.

8. The project provides affordable housing consistent with the goals of the NCFUA Framework Plan. The project would provide trail linkages to future planned

development, the MSCP open space, and other areas within the NCFUA which expands recreational opportunities within the region.

9. The project would generate new temporary construction-related jobs that would enhance the economic base of the region.

For these reasons on balance, the City Council finds there are economic, social, and other considerations resulting from the project that serve to override and outweigh the project's unavoidable significant environmental effects, and thus, the adverse unavoidable effects are considered acceptable.

6/11/98

APPENDIX B

FIRE HYDRANT METER PROGRAM

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 1 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

1. **PURPOSE**

1.1 To establish a Departmental policy and procedure for issuance, proper usage and charges for fire hydrant meters.

2. **AUTHORITY**

2.1 All authorities and references shall be current versions and revisions.

2.2 San Diego Municipal Code (NC) Chapter VI, Article 7, Sections 67.14 and 67.15

2.3 Code of Federal Regulations, Safe Drinking Water Act of 1986

2.4 California Code of Regulations, Titles 17 and 22

2.5 California State Penal Code, Section 498B.0

2.6 State of California Water Code, Section 110, 500-6, and 520-23

2.7 Water Department Director

Reference

2.8 State of California Guidance Manual for Cross Connection Programs

2.9 American Water Works Association Manual M-14, Recommended Practice for Backflow Prevention

2.10 American Water Works Association Standards for Water Meters

2.11 U.S.C. Foundation for Cross Connection Control and Hydraulic Research Manual

3. **DEFINITIONS**

3.1 **Fire Hydrant Meter:** A portable water meter which is connected to a fire hydrant for the purpose of temporary use. (These meters are sometimes referred to as Construction Meters.)

3.2 **Temporary Water Use:** Water provided to the customer for no longer than twelve (12) months.

3.3 **Backflow Preventor:** A Reduced Pressure Principal Assembly connected to the outlet side of a Fire Hydrant Meter.

4. POLICY

4.1 The Water Department shall collect a deposit from every customer requiring a fire hydrant meter and appurtenances prior to providing the meter and appurtenances (see Section 7.1 regarding the Fees and Deposit Schedule). The deposit is refundable upon the termination of use and return of equipment and appurtenances in good working condition.

4.2 Fire hydrant meters will have a 2 ½" swivel connection between the meter and fire hydrant. The meter shall not be connected to the 4" port on the hydrant. All Fire Hydrant Meters issued shall have a Reduced Pressure Principle Assembly (RP) as part of the installation. Spanner wrenches are the only tool allowed to turn on water at the fire hydrant.

4.3 The use of private hydrant meters on City hydrants is prohibited, with exceptions as noted below. All private fire hydrant meters are to be phased out of the City of San Diego. All customers who wish to continue to use their own fire hydrant meters must adhere to the following conditions:

a. Meters shall meet all City specifications and American Water Works Association (AWWA) standards.

b. Customers currently using private fire hydrant meters in the City of San Diego water system will be allowed to continue using the meter under the following conditions:

1. The customer must submit a current certificate of accuracy and calibration results for private meters and private backflows annually to the City of San Diego, Water Department, Meter Shop.

2. The meter must be properly identifiable with a clearly labeled serial number on the body of the fire hydrant meter. The serial number shall be plainly stamped on the register lid and the main casing. Serial numbers shall be visible from the top of the meter casing and the numbers shall be stamped on the top of the inlet casing flange.

3. All meters shall be locked to the fire hydrant by the Water Department, Meter Section (see Section 4.7).

4. All meters shall be read by the Water Department, Meter Section (see Section 4.7).

5. All meters shall be relocated by the Water Department, Meter Section (see Section 4.7).

6. These meters shall be tested on the anniversary of the original test date and proof of testing will be submitted to the Water Department, Meter Shop, on a yearly basis. If not tested, the meter will not be allowed for use in the City of San Diego.

7. All private fire hydrant meters shall have backflow devices attached when installed.

8. The customer must maintain and repair their own private meters and private backflows.

9. The customer must provide current test and calibration results to the Water Department, Meter Shop after any repairs.

10. When private meters are damaged beyond repair, these private meters will be replaced by City owned fire hydrant meters.

11. When a private meter malfunctions, the customer will be notified and the meter will be removed by the City and returned to the customer for repairs. Testing and calibration results shall be given to the City prior to any re-installation.

12. The register shall be hermetically sealed straight reading and shall be readable from the inlet side. Registration shall be in hundred cubic feet.

13. The outlet shall have a 2 ½ "National Standards Tested (NST) fire hydrant male coupling.

14. Private fire hydrant meters shall not be transferable from one contracting company to another (i.e. if a company goes out of business or is bought out by another company).

4.4 All fire hydrant meters and appurtenances shall be installed, relocated and removed by the City of San Diego, Water Department. All City owned fire hydrant meters and appurtenances shall be maintained by the City of San Diego, Water Department, Meter Services.

4.5 If any fire hydrant meter is used in violation of this Department Instruction, the violation will be reported to the Code Compliance Section for investigation and appropriate action. Any customer using a fire hydrant meter in violation of the requirements set forth above is subject to fines or penalties pursuant to the Municipal Code, Section 67.15 and Section 67.37.

4.6 **Conditions and Processes for Issuance of a Fire Hydrant Meter**

Process for Issuance

a. Fire hydrant meters shall only be used for the following purposes:

1. Temporary irrigation purposes not to exceed one year.

2. Construction and maintenance related activities (see Tab 2).

b. No customer inside or outside the boundaries of the City of San Diego Water Department shall resell any portion of the water delivered through a fire hydrant by the City of San Diego Water Department.

c. The City of San Diego allows for the issuance of a temporary fire hydrant meter for a period not to exceed 12 months (365 days). An extension can only be granted in writing from the Water Department Director for up to 90 additional days. A written request for an extension by the consumer must be submitted at least 30 days prior to the 12 month period ending. No extension shall be granted to any customer with a delinquent account with the Water Department. No further extensions shall be granted.

d. Any customer requesting the issuance of a fire hydrant meter shall file an application with the Meter Section. The customer must complete a "Fire Hydrant Meter Application" (Tab 1) which includes the name of the company, the party responsible for payment, Social Security number and/or California ID, requested location of the meter (a detailed map signifying an exact location), local contact person, local phone number, a contractor's license (or a business license), description of specific water use, duration of use at the site and full name and address of the person responsible for payment.

e. At the time of the application the customer will pay their fees according to the schedule set forth in the Rate Book of Fees and Charges, located in the City Clerk's Office. All fees must be paid by check, money order or cashiers check, made payable to the City Treasurer. Cash will not be accepted.

f. No fire hydrant meters shall be furnished or relocated for any customer with a delinquent account with the Water Department.

g. After the fees have been paid and an account has been created, the

meter shall be installed within 48 hours (by the second business day). For an additional fee, at overtime rates, meters can be installed within 24 hours (within one business day).

4.7 **Relocation of Existing Fire Hydrant Meters**

a. The customer shall call the Fire Hydrant Meter Hotline (herein referred to as "Hotline"), a minimum of 24 hours in advance, to request the relocation of a meter. A fee will be charged to the existing account, which must be current before a work order is generated for the meter's relocation.

b. The customer will supply in writing the address where the meter is to be relocated (map page, cross street, etc). The customer must update the original Fire Hydrant Meter Application with any changes as it applies to the new location.

c. Fire hydrant meters shall be read on a monthly basis. While fire hydrant meters and backflow devices are in service, commodity, base fee and damage charges, if applicable, will be billed to the customer on a monthly basis. If the account becomes delinquent, the meter will be removed.

4.8 **Disconnection of Fire Hydrant Meter**

a. After ten (10) months a "Notice of Discontinuation of Service" (Tab 3) will be issued to the site and the address of record to notify the customer of the date of discontinuance of service. An extension can only be granted in writing from the Water Department Director for up to 90 additional days (as stated in Section 4.6C) and a copy of the extension shall be forwarded to the Meter Shop Supervisor. If an extension has not been approved, the meter will be removed after twelve (12) months of use.

b. Upon completion of the project the customer will notify the Meter Services office via the Hotline to request the removal of the fire hydrant meter and appurtenances. A work order will be generated

for removal of the meter.

c. Meter Section staff will remove the meter and backflow prevention assembly and return it to the Meter Shop. Once returned to the Meter Shop the meter and backflow will be tested for accuracy and functionality.

d. Meter Section Staff will contact and notify Customer Services of the final read and any charges resulting from damages to the meter and backflow or its appurtenance. These charges will be added on the customer's final bill and will be sent to the address of record. Any customer who has an outstanding balance will not receive additional meters.

e. Outstanding balances due may be deducted from deposits and any balances refunded to the customer. Any outstanding balances will be turned over to the City Treasurer for collection. Outstanding balances may also be transferred to any other existing accounts.

5. EXCEPTIONS

5.1 Any request for exceptions to this policy shall be presented, in writing, to the Customer Support Deputy Director, or his/her designee for consideration.

6. MOBILE METER

6.1 Mobile meters will be allowed on a case by case basis. All mobile meters will be protected by an approved backflow assembly and the minimum requirement will be a Reduced Pressure Principal Assembly. The two types of Mobile Meters are vehicle mounted and floating meters. Each style of meters has separate guidelines that shall be followed for the customer to retain service and are described below:

a) **Vehicle Mounted Meters**: Customer applies for and receives a City owned Fire Hydrant Meter from the Meter Shop. The customer mounts the meter on the vehicle and brings it to the Meter Shop for

inspection. After installation is approved by the Meter Shop the vehicle and meter shall be brought to the Meter Shop on a monthly basis for meter reading and on a quarterly basis for testing of the backflow assembly. Meters mounted at the owner's expense shall have the one year contract expiration waived and shall have meter or backflow changed if either fails.

b) **Floating Meters**: Floating Meters are meters that are not mounted to a vehicle. **(Note: All floating meters shall have an approved backflow assembly attached.)** The customer shall submit an application and a letter explaining the need for a floating meter to the Meter Shop. The Fire Hydrant Meter Administrator, after a thorough review of the needs of the customer, (i.e. number of jobsites per day, City contract work, lack of mounting area on work vehicle, etc.), may issue a floating meter. At the time of issue, it will be necessary for the customer to complete and sign the "Floating Fire Hydrant Meter Agreement" which states the following:

    1) The meter will be brought to the Meter Shop at 2797 Caminito Chollas, San Diego on the third week of each month for the monthly read by Meter Shop personnel.

    2) Every other month the meter will be read and the backflow will be tested. This date will be determined by the start date of the agreement.

If any of the conditions stated above are not met the Meter Shop has the right to cancel the contract for floating meter use and close the account associated with the meter. The Meter Shop will also exercise the right to refuse the issuance of another floating meter to the company in question.

Any Fire Hydrant Meter using reclaimed water shall not be allowed use again with any potable water supply. The customer shall incur the cost of replacing the meter and backflow device in this instance.

7. FEE AND DEPOSIT SCHEDULES

7.1 **Fees and Deposit Schedules:** The fees and deposits, as listed in the Rate Book of Fees and Charges, on file with the Office of the City Clerk, are based on actual reimbursement of costs of services performed, equipment and materials. Theses deposits and fees will be amended, as needed, based on actual costs. Deposits, will be refunded at the end of the use of the fire hydrant meter, upon return of equipment in good working condition and all outstanding balances on account are paid. Deposits can also be used to cover outstanding balances.

All fees for equipment, installation, testing, relocation and other costs related to this program are subject to change without prior notification. The Mayor and Council will be notified of any future changes.

8. UNAUTHORIZED USE OF WATER FROM A HYDRANT

8.1 Use of water from any fire hydrant without a properly issued and installed fire hydrant meter is theft of City property. Customers who use water for unauthorized purposes or without a City of San Diego issued meter will be prosecuted.

8.2 If any unauthorized connection, disconnection or relocation of a fire hydrant meter, or other connection device is made by anyone other than authorized Water Department personnel, the person making the connection will be prosecuted for a violation of San Diego Municipal Code, Section 67.15. In the case of a second offense, the customer's fire hydrant meter shall be confiscated and/or the deposit will be forfeited.

8.3 Unauthorized water use shall be billed to the responsible party. Water use charges shall be based on meter readings, or estimates when meter readings are not available.

8.4 In case of unauthorized water use, the customer shall be billed for all applicable charges as if proper authorization for the water use had been obtained, including but not limited to bi-monthly service charges, installation charges and removal charges.

8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

Water Department Director

Tabs: 1. Fire Hydrant Meter Application
2. Construction & Maintenance Related Activities With No Return To Sewer
3. Notice of Discontinuation of Service

APPENDIX

Administering Division: Customer Support Division

Subject Index:
Construction Meters
Fire Hydrant
Fire Hydrant Meter Program
Meters, Floating or Vehicle Mounted
Mobile Meter
Program, Fire Hydrant Meter

Distribution: DI Manual Holders

PUBLIC UTILITIES

Application for Fire Hydrant Meter (EXHIBIT A)

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

Application Date	Requested Install Date:

Meter Information

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) Zip:	T.B.	G.B. (CITY USE)
Specific Use of Water:		
Any Return to Sewer or Storm Drain, If so , explain:		
Estimated Duration of Meter Use: ☐ Check Box If Reclaimed Water		

Company Information

Company Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
*Business license#	*Contractor license#		
A Copy of the Contractor's license OR Business License is required at the time of meter issuance.			
Name and Title of Billing Agent: (PERSON IN ACCOUNTS PAYABLE)			Phone: ( )
Site Contact Name and Title:			Phone: ( )
Responsible Party Name:			Title:
Cal ID#			Phone: ( )
Signature:	Date:		

Guarantees Payment of all Charges Resulting from the use of this Meter. Insures that employees of this Organization understand the proper use of Fire Hydrant Meter

☐ Fire Hydrant Meter Removal Request	Requested Removal Date:	
Provide Current Meter Location if Different from Above:		
Signature:	Title:	Date:
Phone: ( )	Pager: ( )	

☐ City Meter ☐ Private Meter		
Contract Acct #:	Deposit Amount: $ 936.00	Fees Amount: $ 62.00
Meter Serial #	Meter Size: 05	Meter Make and Style: 6-7
Backflow #	Backflow Size:	Backflow Make and Style:
Name:	Signature:	Date:

WATER USES WITHOUT ANTICIPATED CHARGES FOR RETURN TO SEWER

Auto Detailing
Backfilling
Combination Cleaners (Vactors)
Compaction
Concrete Cutters
Construction Trailers
Cross Connection Testing
Dust Control
Flushing Water Mains
Hydro Blasting
Hydro Seeing
Irrigation (for establishing irrigation only; not continuing irrigation)
Mixing Concrete
Mobile Car Washing
Special Events
Street Sweeping
Water Tanks
Water Trucks
Window Washing

Note:

1. If there is any return to sewer or storm drain, then sewer and/or storm drain fees will be charges.

Date

Name of Responsible Party
Company Name and Address
Account Number:_____

Subject: Discontinuation of Fire Hydrant Meter Service

Dear Water Department Customer:

The authorization for use of Fire Hydrant Meter #_____, located at *(Meter Location Address)* ends in 60 days and will be removed on or after *(Date Authorization Expires)*. Extension requests for an additional 90 days must be submitted in writing for consideration 30 days prior to the discontinuation date. If you require an extension, please contact the Water Department, or mail your request for an extension to:

City of San Diego
Water Department
Attention: Meter Services
2797 Caminito Chollas
San Diego, CA 92105-5097

Should you have any questions regarding this matter, please call the Fire Hydrant Hotline at (619)_____-_____.

Sincerely,

Water Department

APPENDIX C

MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE

MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE

1. Soil amendment
2. Fiber mulch
3. PVC or PE pipe up to 16 inch diameter
4. Stabilizing emulsion
5. Lime
6. Preformed elastomeric joint seal
7. Plain and fabric reinforced elastomeric bearing pads
8. Steel reinforced elastomeric bearing pads
9. Waterstops (Special Condition)
10. Epoxy coated bar reinforcement
11. Plain and reinforcing steel
12. Structural steel
13. Structural timber and lumber
14. Treated timber and lumber
15. Lumber and timber
16. Aluminum pipe and aluminum pipe arch
17. Corrugated steel pipe and corrugated steel pipe arch
18. Structural metal plate pipe arches and pipe arches
19. Perforated steel pipe
20. Aluminum underdrain pipe
21. Aluminum or steel entrance tapers, pipe downdrains, reducers, coupling bands and slip joints
22. Metal target plates
23. Paint (traffic striping)
24. Conductors
25. Painting of electrical equipment
26. Electrical components
27. Engineering fabric
28. Portland Cement
29. PCC admixtures
30. Minor concrete, asphalt
31. Asphalt (oil)
32. Liquid asphalt emulsion
33. Epoxy

APPENDIX D

SAMPLE CITY INVOICE WITH CASH FLOW FORECAST

City of San Diego, CM&FS Div., 9753 Chesapeake Drive, SD CA 92123

Project Name:

Work Order No or Job Order No.

City Purchase Order No.

Resident Engineer (RE):

RE Phone#: Fax#:

Contractor's Name:

Contractor's Address:

Contractor's Phone #:

Contractor's fax #:

Contact Name:

Invoice No.

Invoice Date:

Billing Period: (To)

Item #	Item Description	Contract Authorization				Previous Totals To Date		This Estimate		Totals to Date	
		Unit	Price	Qty	Extension	%/QTY	Amount	% / QTY	Amount	% / QTY	Amount
1					$ -		$ -		$ -	0.00	$ -
2					$ -		$ -		$ -	0.00%	$ -
3					$ -		$ -		$ -	0.00%	$ -
4					$ -		$ -		$ -	0.00%	$ -
5					$ -		$ -		$ -	0.00%	$ -
6					$ -		$ -		$ -	0.00%	$ -
7					$ -		$ -		$ -	0.00%	$ -
8					$ -		$ -		$ -	0.00%	$ -
5					$ -		$ -		$ -	0.00%	$ -
6					$ -		$ -		$ -	0.00%	$ -
7					$ -		$ -		$ -	0.00%	$ -
8					$ -		$ -		$ -	0.00%	$ -
9					$ -		$ -		$ -	0.00%	$ -
10					$ -		$ -		$ -	0.00%	$ -
11					$ -		$ -		$ -	0.00%	$ -
12					$ -		$ -		$ -	0.00%	$ -
13					$ -		$ -		$ -	0.00%	$ -
14					$ -		$ -		$ -	0.00%	$ -
15					$ -		$ -		$ -	0.00%	$ -
16					$ -		$ -		$ -	0.00%	$ -
17	**Field Orders**				$ -		$ -		$ -	0.00%	$ -
					$ -		$ -		$ -	0.00%	$ -
	CHANGE ORDER No.				$ -		$ -		$ -	0.00%	$ -
					$ -		$ -		$ -	0.00%	$ -
	Total Authorized Amount (including approved Change Order)				**$ -**		**$ -**		$ -	**Total Billed**	$ -

SUMMARY

A. Original Contract Amount	$ -
B. Approved Change Order #00 Thru #00	$ -
C. Total Authorized Amount (A+B)	$ -
D. Total Billed to Date	$ -
E. Less Total Retention (5% of D)	$ -
F. Less Total Previous Payments	$ -
G. Payment Due Less Retention	**$0.00**
H. Remaining Authorized Amount	$0.00

I certify that the materials have been received by me in the quality and quantity specified

_____

Resident Engineer

_____

Construction Engineer

Retention and/or Escrow Payment Schedule

Total Retention Required as of this billing (Item E)	$0.00
Previous Retention Withheld in PO or in Escrow	$0.00
Add'l Amt to Withhold in PO/Transfer in Escrow:	***$0.00***
Amt to Release to Contractor from PO/Escrow:	

Contractor Signature and Date: _____

NOTE: CONTRACTOR TO CALCULATE TO THE 2ND DECIMAL PLACE.

WBS #:	B18108
Date Submitted:	10/10/2018
NTP Date:	3/23/2018
Final Statement of WD Date:	5/23/2020
Contract #:	K-XX-XXXX-XXX-X
Contract Amount:	$5,617,000

Construction Cash Flow Forecast

"Sewer and Water Group Job 965 (W)"

Year	January	February	March	April	May	June	July	August	September	October	November	December
2018				15,000	25,000	52,000	52,000	100,000	10,000	100,000	100,000	100,000
2019	10,000	10,000	85,000	58,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000	1,000,000
2020	100,000	100,000	100,000	1,000,000	1,000,000							
2021												
2022												
2023												
2024												
2025												

APPENDIX E

LOCATION MAP


The City of SAN DIEGO Public Works
PACIFIC HIGHLANDS RANCH LIBRARY
LOCATION MAP
VILLAGE CENTER LOOP
Legend
Project Location
No Scale
COMMUNITY NAME: PACIFIC HIGHLAND RANCH
COUNCIL DISTRICT: 01
SAP ID: B-14023

APPENDIX F

SAMPLE OF PUBLIC NOTICE

FOR SAMPLE REFERENCE ONLY

The City of SAN DIEGO

CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
- Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
- This work is anticipated to be complete in your community by December 2016.

How your neighborhood may be impacted:

- Water service to some properties during construction will be provided by a two-inch highline pipe that will run along the curb. To report a highline leak call 619-515-3525.
- Temporary water service disruptions are planned. If planned disruptions impact your property, you will receive advance notice.
- Parking restrictions will exist because of the presence of construction equipment and materials.
- "No Parking" signs will be displayed 72 hours in advance of the work.
- Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:
Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:
Company Name, XXX-XXX-XXXX

To contact the City of San Diego: SD Public Works
619-533-4207 | engineering@sandiego.gov | sandiego.gov/CIP

This information is available in alternative formats upon request.

The City of SAN DIEGO

CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
- Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
- This work is anticipated to be complete in your community by December 2016.

How your neighborhood may be impacted:

- Water service to some properties during construction will be provided by a two-inch highline pipe that will run along the curb. To report a highline leak call 619-515-3525.
- Temporary water service disruptions are planned. If planned disruptions impact your property, you will receive advance notice.
- Parking restrictions will exist because of the presence of construction equipment and materials.
- "No Parking" signs will be displayed 72 hours in advance of the work.
- Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:
Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:
Company Name, XXX-XXX-XXXX

To contact the City of San Diego: SD Public Works
619-533-4207 | engineering@sandiego.gov | sandiego.gov/CIP

This information is available in alternative formats upon request.

APPENDIX G

SWPPP CONSTRUCTION BMP MAINTENANCE LOG

SWPPP Construction BMP Maintenance Log

Examples of construction BMP maintenance activites include but are not limited to tasks listed below. The contractor is ultimately responsible for compliance with the Storm Water Standards Manual and/or the Construction General Permit, and for ensuring all BMPs function per manufacturer's specifications. Use the attached log to schedule and document maintenance activities. The log shall be kept with the project SWPPP document at all times.

Construction BMP Maintenance Acitivities

- Maintain stabilized construction entrances/exits
- Redress gravel/rock to full coverage and remove any sediment accumulation
- Remove and replace geotextile/compost blanket/plastic with holes or tears
- Redress and restabilize erosion or rilling greater than 1-inch deep
- Reapply hydraulic stabilization products to full coverage
- Remove and replace silt fence/fiber roll/gravel bags/etc. with holes or tears
- Reinstall or replace silt fence/fiber roll/etc. with sags
- Remove sediment accumulation from perimeter controls
- Remove sediment accumulation from storm drain inlet protection and check dams
- Remove sediment accumulation from energy dissipators
- Repair or remove any vehicle/equipment that leaks
- Remove any accumulation in drip pans or containment
- Empty concrete washouts when they reach 75% capacity
- Empty waste disposal containers when they reach 95% capacity

Construction BMP Maintenance Log

Project Title:
WBS/IO No:
WDID:

Scheduled Date/Time	Completion Date/Time	Location	Maintenance Tasks Performed	Logged By

APPENDIX H

STANDARD PARTNERING SPECIFICATION - VERTICAL CONSTRUCTION PARTNERING LEVEL 2

INTERNATIONAL PARTNERING INSTITUTE (IPI)
STANDARD PARTNERING SPECIFICATION
VERTICAL CONSTRUCTION PARTNERING LEVEL 2
(SMALL PROJECT PARTNERING)

DIVISION 1 - PARTNERING REQUIREMENT AND PROCESS

SECTION 1 - GENERAL

The purpose of this specification is to outline a process designed to develop a collaborative environment for your project so that communication, coordination, and cooperation are the norm. This Collaborative Partnering approach will aid issue resolution and will lesson impacts on project budget, schedule and quality.

(City of San Diego) works in a collaborative and cooperative manner with all project stakeholders including the Prime Contractor or Design/Builder (Contractor), all subcontractors, all project architects and engineers; material suppliers, specialty consultants, vendors, representatives of other agencies and the community at large. Partnering is our way of doing business. In executing the contract associated with this specification, each stakeholder agrees that they will actively and enthusiastically participate in the Collaborative Partnering process defined here. Contractor agrees that all sub-contractors, material contractors and other entities within its contractual control will participate in the Partnering process as required. Contractor will make this a specific contractual condition for all sub-contractors, material suppliers, and other entities working on this project. The Architect and/or Engineer for this project and any other consultants engaged in this project have agreed to participate in the Partnering process as defined here.

Formal Collaborative Partnering for this project will start within 30 days of the Notice to Proceed and will include these elements (defined in Section 3):

1. A mutually agreed, IPI Certified Professional Partnering Facilitator (or approved equal)
2. A “Partnering Charter”, which includes the joint development of goals
3. A periodic, joint evaluation process
4. Executive Level and Core Team Partnering
5. A Partnering Follow-up Plan to resolve potential problems at the lowest possible level

Participation in the formal Partnering process defined here will not void any contract part. All rights and remedies defined by the final contract will be preserved.

SECTION 2 - DESCRIPTION

A. Definitions

1. Project Team: the group of people and organizations who are executing a construction project and who have influence on the outcome. The Project Team is comprised of the Owner/Owners Rep, the Owner's Consultants, the Contractor, the Designer, the sub-contractor(s), and other stakeholders including Government agencies, tenants, materials suppliers, concessionaires, and third parties affected by the construction project.

2. Partnering: an effort by the Project Team to develop joint goals and to establish a cooperative atmosphere regarding execution of the construction project, regardless of delivery method.

3. Multi-Tiered Partnering: For large, complex projects, the participants in partnering workshops will be divided into subgroups: Executive Level and the Core Team.
    a. Executive Level Partnering: workshops involving Executive representatives from the Owner, Contractor, and key Subs who serve as a "project board of directors" to steer the project.
    b. Core Team Partnering: workshops involving the central group responsible for the successful execution of the project as well as key individuals who are on the project throughout its duration. Typically, field-level Project Managers (PMs) and Superintendents from the owner, contractor, design, subs, key third-parties and stakeholder groups attend these sessions. Representatives from Executive Level Partnering should also attend to ensure commitments and follow through.

4. Project Team Leaders: Project Managers (PMs) from both the Owner and Contractor who are accountable for the day-to-day operations of the project and are responsible for leading the partnering effort. They will also be in charge of coordinating project Partnering meeting times, selecting meeting locations and other logistics.

B. The Goals of Partnering are to:

1. Use early and frequent communication with project stakeholders
2. Develop and maintain a relationship based on shared trust, mutual respect and commitment
3. Identify, quantify, and support attainment of co-created goals
4. Establish strategies for implementing risk management concepts and identify potential project efficiencies
5. Use timely communication and decision-making
6. Resolve potential problems at the lowest possible level to avoid negative impacts on the project
7. Hold periodic partnering meetings and workshops throughout the life of the project to maintain the benefits of a partnered relationship
8. Establish periodic joint evaluations of the partnering process and attainment of mutual goals

SECTION 3 - PARTNERING IMPLEMENTATION – Level 2 Project

A. Selecting an Independent Professional Neutral Partnering Facilitator

1. For projects with a budget exceeding $5M, the Contractor agrees that an Independent Professional Neutral Partnering Facilitator will be retained to facilitate the project Partnering process.

2. (Owner/Owner's Rep), Designer/Architect, and the Contractor Rep will cooperatively select a Certified IPI Partnering Facilitator (or approved equal) that offers the service of a periodic partnering evaluation survey with a 5-point rating scale and agrees to follow IPI's "Partnering Facilitator Standards and Expectations" available at IPI's website.

B. Partnering Initiation

1. To initiate the Partnering arrangement, the Project Team will conduct an open discussion prior to the start of the job to select the Facilitator. It is expected that, at the conclusion of the initial discussion, the parties will express a consensus regarding, the Facilitator and, among other things, the respective goals in completing the contract.

   Thereafter, the Project Team will continue discussions as necessary and will conduct periodic joint evaluations of performance throughout the life of the contract as outlined below. It is expected that the parties will use the services of the Facilitator not only at the initial partnering workshop, but also to assist in later discussions.

2. In leading the ongoing Partnering effort, Project Team Leaders will schedule the initial partnering workshop. All relevant stakeholders will be expected to attend and participate. It is typical that project partnering sessions may include between 8 and 25 individuals.

   Project Team Leaders will also:
   a. Identify the initial suitable workshop site and appropriate meeting duration for the size and complexity of the project.
   b. Agree to other workshop administrative details.
   c. Project Team Leaders will agree to periodic partnering workshops and sessions as outlined in Section 3-part B.
   d. Agree to conduct a project close-out partnering workshop.
   e. Agree to document lessons learned as a condition of final project acceptance.

C. Partnering Charter (Level 2 Project)

In implementing project partnering, the project team will agree to create a "Partnering Charter" that includes the agreed-on mutual goals, the

Partnering Follow-up Plan, the Partnering Dispute Resolution Plan, and the signed Team Commitment signature page, explained in detail below:

1. Agreed-on mutual goals, which will include the core project goals and may also include project-specific goals and mutually supported individual goals.
    a. The mandatory core goals are that the Project is constructed (at minimum):
        i. On time
        ii. On budget
        iii. Safely
        iv. Quality Met
    b. Optional project-specific goals include – win a Partnering Award, excellent communication with local community (zero complaints), effective communication with Media, mitigation of project risks (e.g. environmental requirements met, stakeholder interests understood and managed, etc.).

2. The Partnering Follow-up Plan
    a. Attendees:
    For Level 2 Projects, Partnering will be established in two groups:
        i. Executive Level Sponsors (from Owner, Prime Contractor and key subs) to steer the project and assist with goals.
        ii. Core Team: Project Managers and Superintendents working at the field-level from owner, contractor, design, subs and key third-parties and stakeholder groups
    b. Frequency of Partnering Sessions:
    For Level 2 Partnering, the team will conduct joint Partnering Meetings for (1) full day session before construction start and (2) half day sessions during construction. Further periodic partnering sessions can also be scheduled as determined necessary by the primary project stakeholders.

3. Partnering Dispute Resolution Plan

    The goal of the project Dispute Resolution process is to prevent conflicts from hindering project momentum and causing slowing the project down. It is the Owner's expectation that issues not effectively settled at the Field Level will elevate according to the Dispute Resolution Ladder (sample below). The goal is that project momentum can be maintained while a decision is reached by the next layer of Project Management, who can rely on a broader project perspective in decision making.

    The Dispute Resolution process is bisected into two-sections, Project Team-driven Dispute Resolution and 3rd-party Driven Dispute Resolution. As the Project Team progresses from less formal to more formal dispute resolution processes, it is important to understand that

decision-making shifts from the project team, to 3rd party experts. The team will be expected to select and document planned Dispute Resolution processes during the kick-off Partnering session. (Please visit the IPI Partnering Field Guide for a detailed explanation of the various forms of Alternative Dispute Resolution).

a. Project Team Dispute Resolution
   i. Field-Level Negotiation
   ii. Dispute Resolution Ladder (Sample – please refer to IPI Specification Owner's Guide additional information)
   iii. Facilitated Dispute Resolution (FDR) is a meditative process where the IPI Certified Construction Partnering Facilitator (Facilitator) helps the team negotiate disputed issues. In FDR, the Project Team discusses project issues and the Facilitator serves as a Neutral, offering opinions and providing settlement options. Often, Project Teams are provided 20 days to conduct this process. (Please refer to Section 5 for details).

	Architect/Engineer	Suppliers/Subs	
	Owner	**Contractor**	**Time to Elevate**
Level I	Assistant Supervisor or Engineer	Foreman	End of shift
Level II	Project Superintendent or Project Engineer	Superintendent, General Foreman, or Project Manager	Up to 1 day
Level III	Construction Manager	Project Manager Area Manager	1 week
Level IV	Project Director or Program Manager	Area Manager Owner	2 weeks
Level V	Director of Facilities Department or Manager of Capital Programs	Owner	2 weeks
Level IV	Board of Supervisors	Owner	**Select next form of Alternative Dispute Resolution (Typically FDR followed by the DRA/DRB)**

b. 3rd Party-Driven Dispute Resolution
   i. Dispute Review Board or Dispute Resolution Advisor – a panel of construction experts may review a claim and render a non-binding, 3rd party decision to the Project Team. Additional time is granted to the team to engage in this process and make final decision.
   ii. Mediation – Prior to Litigation, a Project Team may elect to attempt Mediation, a voluntary, consensual, and confidential process involving attorneys and a 3rd Party Neutral with expertise in Dispute Resolution and/or Construction Litigation.
   iii. Arbitration – Prior to litigation, a Project Team may elect Arbitration, a short-form, contracted, dispute resolution option, where Parties in dispute present to a panel of 3

subject matter experts who render a final decision with limited appeal options.

c. Litigation
   i. Mini-Trials: short form Court Preceding for claims litigation that attempts to reduce cost of full civil trial.
   ii. Traditional Civil Trial.

4. Team commitment statement and signature document (refer to IPI Specification Owner's Guide for example)

D. Partnering Evaluation

1. Owner, contractor, major sub-contractors, architects and engineers, and major stakeholders will participate in monthly partnering evaluation surveys to measure progress on mutual goals and short-term key issues as they arise.
   a. Partnering Evaluations will be collected by Facilitator
   b. Results will be shared with project team

2. Owner, Contractor, major sub-contractors, and major stakeholders will evaluate the partnering facilitator using IPI Forms (IPI-E1 and IPI-E2). The (Owner/Owner's Rep) will provide the evaluation forms to the project team and collect the results.

3. (Owner/Owner's Rep) will make evaluation results available upon request.

4. Facilitator evaluations must be completed twice:
   a. At the end of the **initial partnering workshop** on Form IPI-E1.
   b. At the end of the **project close-out partnering workshop** on Form IPI-E2.

SECTION 4 - PARTNERING PAYMENT

A. The (Owner/Owner's Rep) agrees to pay:
   1. 50% of cost for:
      a. facilitator workshops and sessions based costs
      b. monthly partnering evaluation survey service cost
   2. Contractor agrees to pay 50% of all partnering cost included as part of their lump sum.

B. Payment amount will be based on invoice prices minus any available or offered discounts. (Owner/Owner's Rep) will not pay markup on these costs.

SECTION 5 - PARTNERING DISPUTE RESOLUTION

A. (Owner/Owner Rep) will encourage the project team to use all forms of Project Team-Driven Dispute Resolution prior to engaging a neutral 3rd party. When the Project-Team is unable to resolve the issue, a Facilitated Dispute Resolution (FDR) session may be an effective method for clarifying issues and resolving all or part of a dispute.

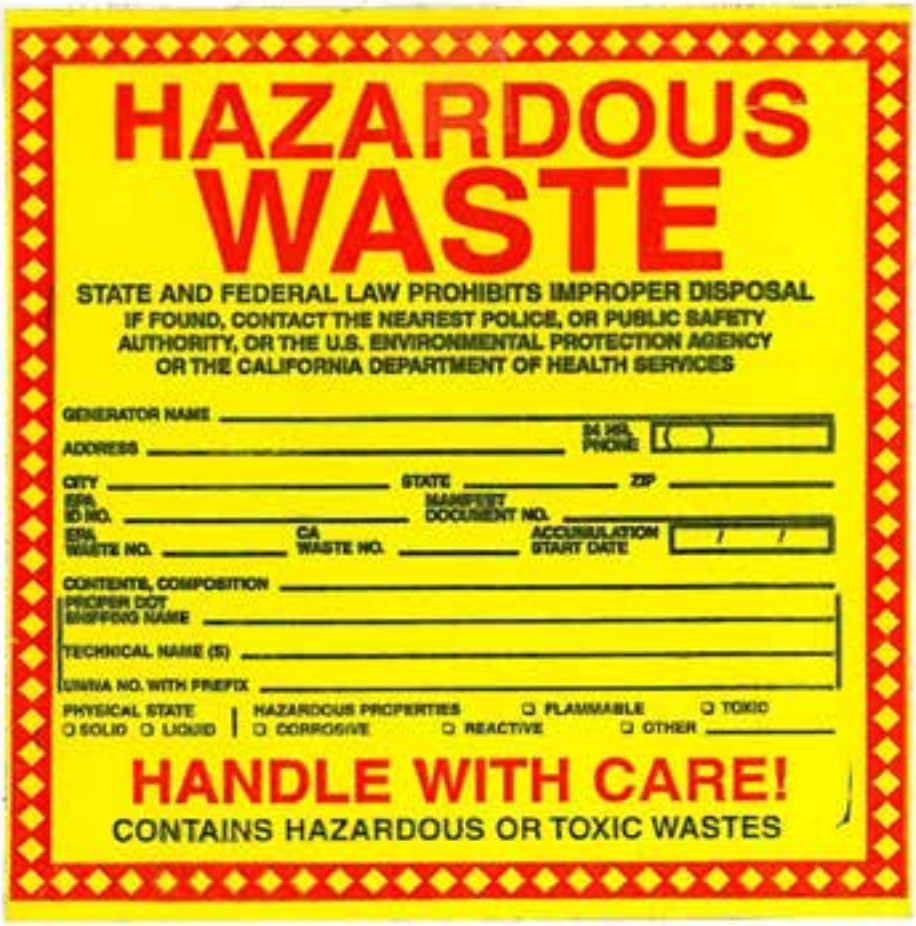
B. In order to ensure the project team has sufficient time to plan and hold an FDR session, a maximum of 20 days may be added to the Dispute Review Board (DRB) referral time following the Owner's written response to a supplemental notice of potential claim.

C. In order to be granted this additional referral time, the project team must document its intention in to use FDR in the Dispute Resolution Plan of the Partnering Charter. The team may also document agreements for other associated criteria to be met in order to access the additional referral time in the Dispute Resolution Plan. If no session is held, the DRB referral time will remain in effect as specified in the Dispute Resolution Plan (See Section 3-part C for details).

End of Specification

APPENDIX I

HAZARDOUS WASTE LABEL/FORMS


HAZARDOUS
WASTE
STATE AND FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY
AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY
OR THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES
GENERATOR NAME
ADDRESS
24 HR. PHONE
CITY
STATE
ZIP
EPA ID NO.
MANIFEST DOCUMENT NO.
EPA WASTE NO.
CA WASTE NO.
ACCUMULATION START DATE
CONTENTS, COMPOSITION
PROPER DOT SHIPPING NAME
TECHNICAL NAME (S)
UN/NA NO. WITH PREFIX
PHYSICAL STATE
SOLID LIQUID
HAZARDOUS PROPERTIES
CORROSIVE
FLAMMABLE
REACTIVE
TOXIC
OTHER
HANDLE WITH CARE!
CONTAINS HAZARDOUS OR TOXIC WASTES

INCIDENT/RELEASE ASSESSMENT FORM [1]

If you have an emergency, Call 911

Handlers of hazardous materials are required to report releases. The following is a tool to be used for assessing if a release is reportable. Additionally, a non-reportable release incident form is provided to document why a release is not reported (see back).

Questions for Incident Assessment:	YES	NO
1. Was anyone killed or injured, or did they require medical care or admitted to a hospital for observation?	❒	❒
2. Did anyone, other than employees in the immediate area of the release, evacuate?	❒	❒
3. Did the release cause off-site damage to public or private property?	❒	❒
4. Is the release greater than or equal to a reportable quantity (RQ)?	❒	❒
5. Was there an uncontrolled or unpermitted release to the air?	❒	❒
6. Did an uncontrolled or unpermitted release escape secondary containment, or extend into any sewers, storm water conveyance systems, utility vaults and conduits, wetlands, waterways, public roads, or off site?	❒	❒
7. Will control, containment, decontamination, and/or clean up require the assistance of federal, state, county, or municipal response elements?	❒	❒
8. Was the release or threatened release involving an unknown material or contains an unknown hazardous constituent?	❒	❒
9. Is the incident a threatened release (a condition creating a substantial probability of harm that requires immediate action to prevent, reduce, or mitigate damages to persons, property, or the environment)?	❒	❒
10. Is there an increased potential for secondary effects including fire, explosion, line rupture, equipment failure, or other outcomes that may endanger or cause exposure to employees, the general public, or the environment?	❒	❒

If the answer is YES to any of the above questions – report the release to the California Office of Emergency Services at 800-852-7550 and the local CUPA daytime: (619) 338-2284, after hours: (858) 565-5255. Note: other state and federal agencies may require notification depending on the circumstances.

Call 911 in an emergency

If all answers are NO, complete a Non Reportable Release Incident Form (page 2 of 2) and keep readily available. Documenting why a "no" response was made to each question will serve useful in the event questions are asked in the future, and to justify not reporting to an outside regulatory agency.

If in doubt, report the release.

[1] This document is a guide for accessing when hazardous materials release reporting is required by Chapter 6.95 of the California Health and Safety Code. It does not replace good judgment, Chapter 6.95, or other state or federal release reporting requirements.

NON REPORTABLE RELEASE INCIDENT FORM

1. RELEASE AND RESPONSE DESCRIPTION Incident #_____

Date/Time Discovered	Date/Time Discharge	Discharge Stopped ☐ Yes ☐ No
Incident Date / Time:		
Incident Business / Site Name:		
Incident Address:		
Other Locators (Bldg, Room, Oil Field, Lease, Well #, GIS)		
Please describe the incident and indicate specific causes and area affected. Photos Attached?: ☐Yes ☐No		
Indicate actions to be taken to prevent similar releases from occurring in the future.		

2. ADMINISTRATIVE INFORMATION

Supervisor in charge at time of incident:	Phone:
Contact Person:	Phone:

3. CHEMICAL INFORMATION

Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Clean-Up Procedures & Timeline:	
Completed By:	Phone:
Print Name:	Title:

EMERGENCY RELEASE FOLLOW - UP NOTICE REPORTING FORM

A

BUSINESS NAME	FACILITY EMERGENCY CONTACT & PHONE NUMBER ( ) -

B

INCIDENT DATE MO DAY YR	TIME OES NOTIFIED (use 24 hr time)	OES CONTROL NO.

C

INCIDENT ADDRESS LOCATION	CITY / COMMUNITY	COUNTY ZIP

D

CHEMICAL OR TRADE NAME (print or type)	CAS Number

CHECK IF CHEMICAL IS LISTED IN 40 CFR 355, APPENDIX A ☐	CHECK IF RELEASE REQUIRES NOTIFI - CATION UNDER 42 U.S.C. Section 9603 (a) ☐

PHYSICAL STATE CONTAINED ☐ SOLID ☐ LIQUID ☐ GAS	PHYSICAL STATE RELEASED ☐ SOLID ☐ LIQUID ☐ GAS	QUANTITY RELEASED

ENVIRONMENTAL CONTAMINATION ☐ AIR ☐ WATER ☐ GROUND ☐ OTHER	TIME OF RELEASE	DURATION OF RELEASE ___DAYS ___HOURS ___MINUTES

E

ACTIONS TAKEN

F

KNOWN OR ANTICIPATED HEALTH EFFECTS (Use the comments section for addition information)

☐ ACUTE OR IMMEDIATE (explain) _____

☐ CHRONIC OR DELAYED (explain) _____

☐ NOTKNOWN (explain)

G

ADVICE REGARDING MEDICAL ATTENTION NECESSARY FOR EXPOSED INDIVIDUALS

H

COMMENTS (INDICATE SECTION (A - G) AND ITEM WITH COMMENTS OR ADDITIONAL INFORMATION)

I

CERTIFICATION: I certify under penalty of law that I have personally examined and I am familiar with the information submitted and believe the submitted information is true, accurate, and complete.

REPORTING FACILITY REPRESENTATIVE (print or type) _____

SIGNATURE OF REPORTING FACILITY REPRESENTATIVE _____ DATE: _____

EMERGENCY RELEASE FOLLOW-UP NOTICE
REPORTING FORM INSTRUCTIONS

GENERAL INFORMATION:

Chapter 6.95 of Division 20 of the California Health and Safety Code requires that written emergency release follow-up notices prepared pursuant to 42 U.S.C. § 11004, be submitted using this reporting form. Non-permitted releases of reportable quantities of Extremely Hazardous Substances (listed in 40 CFR 355, appendix A) or of chemicals that require release reporting under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9603(a)] must be reported on the form, as soon as practicable, but no later than 30 days, following a release. The written follow-up report is required in addition to the verbal notification.

BASIC INSTRUCTIONS:

- The form, when filled out, reports follow-up information required by 42 U.S.C § 11004. Ensure that all information requested by the form is provided as completely as possible.
- If the incident involves reportable releases of more than one chemical, prepare one report form for each chemical released.
- If the incident involves a series of separate releases of chemical(s) at different times, the releases should be reported on separate reporting forms.

SPECIFIC INSTRUCTIONS:

Block A: Enter the name of the business and the name and phone number of a contact person who can provide detailed facility information concerning the release.

Block B: Enter the date of the incident and the time that verbal notification was made to OES. The OES control number is provided to the caller by OES at the time verbal notification is made. Enter this control number in the space provided.

Block C: Provide information pertaining to the location where the release occurred. Include the street address, the city or community, the county and the zip code.

Block D: Provide information concerning the specific chemical that was released. Include the chemical or trade name and the Chemical Abstract Service (CAS) number. Check all categories that apply. Provide best available information on quantity, time and duration of the release.

Block E: Indicate all actions taken to respond to and contain the release as specified in 42 U.S.C. § 11004(c).

Block F: Check the categories that apply to the health effects that occurred or could result from the release. Provide an explanation or description of the effects in the space provided. Use Block H for additional comments/information if necessary to meet requirements specified in 42 U.S.C. § 11004(c).

Block G: Include information on the type of medical attention required for exposure to the chemical released. Indicate when and how this information was made available to individuals exposed and to medical personnel, if appropriate for the incident, as specified in 42 U.S.C. § 11004(c).

Block H: List any additional pertinent information.

Block I: Print or type the name of the facility representative submitting the report. Include the official signature and the date that the form was prepared.

MAIL THE COMPLETED REPORT TO:

State Emergency Response Commission (SERC)
Attn: Section 304 Reports
Hazardous Materials Unit
3650 Schriever Avenue
Mather, CA 95655

NOTE: Authority cited: Sections 25503, 25503.1 and 25507.1, Health and Safety Code. Reference: Sections 25503(b)(4), 25503.1, 25507.1, 25518 and 25520, Health and Safety Code.

APPENDIX J

ADVANCED METERING INFRASTRUCTURE (AMI) DEVICE PROTECTION

Protecting AMI Devices in Meter Boxes and on Street Lights

The Public Utilities Department (PUD) has begun the installation of the Advanced Metering Infrastructure (AMI) technology as a new tool to enhance water meter reading accuracy and efficiency, customer service and billing, and to be used by individual accounts to better manage the efficient use of water. **All AMI devices shall be protected per Section 402-2, "Protection", of the 2018 Whitebook.**

AMI technology allows water meters to be read electronically rather than through direct visual inspection by PUD field staff. This will assist PUD staff and customers in managing unusual consumption patterns which could indicate leaks or meter tampering on a customer's property.

Three of the main components of an AMI system are the:

A. Endpoints, see Photo 1:

Photo 1

B. AMI Antenna attached to Endpoint (antenna not always required), see Photo 2:

Photo 2

Network Devices, see Photo 3:

Photo 3

AMI endpoints transmit meter information to the AMI system and will soon be on the vast majority of meters in San Diego. These AMI devices provide interval consumption data to the PUD's Customer Support Division. If these devices are damaged or communication is interrupted, this Division will be alerted of the situation. The endpoints are installed in water meter boxes, coffins, and vaults adjacent to the meter. A separate flat round antenna may also be installed through the meter box lid. This antenna is connected to the endpoint via cable. The following proper installation shall be implemented when removing the lid to avoid damaging the antenna, cable, and/or endpoint. Photo 4 below demonstrates a diagram of the connection:

Photo 4

The AMI device ERT/Endpoint/Transmitter shall be positioned and installed as discussed in this Appendix. If the ERT/Endpoint/Transmitter is disturbed, it shall be re-installed and returned to its original installation with the end points pointed upwards as shown below in Photo 5.

The PUD's code compliance staff will issue citations and invoices to you for any damaged AMI devices that are not re-installed as discussed in the Contract Document
Photo 5 below shows a typical installation of an AMI endpoint on a water meter.

Photo 5

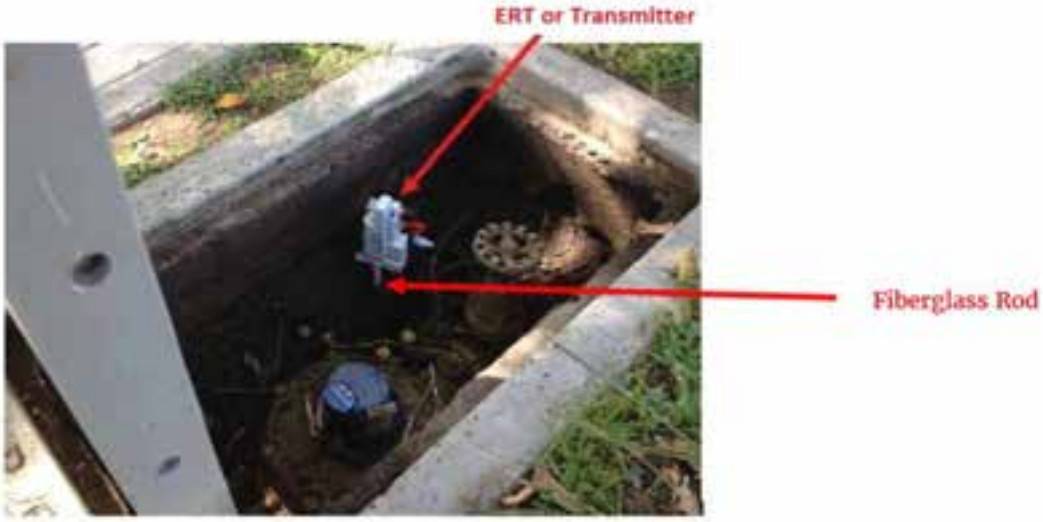


Photo 6 below is an example of disturbance that shall be avoided:

Photo 6

You are responsible when working in and around meter boxes. If you encounter these endpoints, use proper care and do not disconnect them from the registers on top of the water meter. If the lid has an antenna drilled through, do not change or tamper with the lid and inform the Resident Engineer immediately about the location of that lid. Refer to Photo 7 below:

Photo 7

Another component of the AMI system are the Network Devices. The Network Devices are strategically placed units (mainly on street light poles) that collect interval meter reading data from multiple meters for transmission to the Department Control Computer. **If you come across any of these devices on street lights that will be removed or replaced (refer to Photos 8 and 9 below), notify AMI Project Manager Arwa Sayed at (619) 362-0121 immediately.**

Photo 8 shows an installed network device on a street light. On the back of each Network Device is a sticker with contact information. See Photo 9. **Call PUD Water Emergency Repairs at 619-515-3525 if your work will impact these street lights.** These are assets that belong to the City of San Diego and you shall be responsible for any costs of disruption of this network.

Photo 8

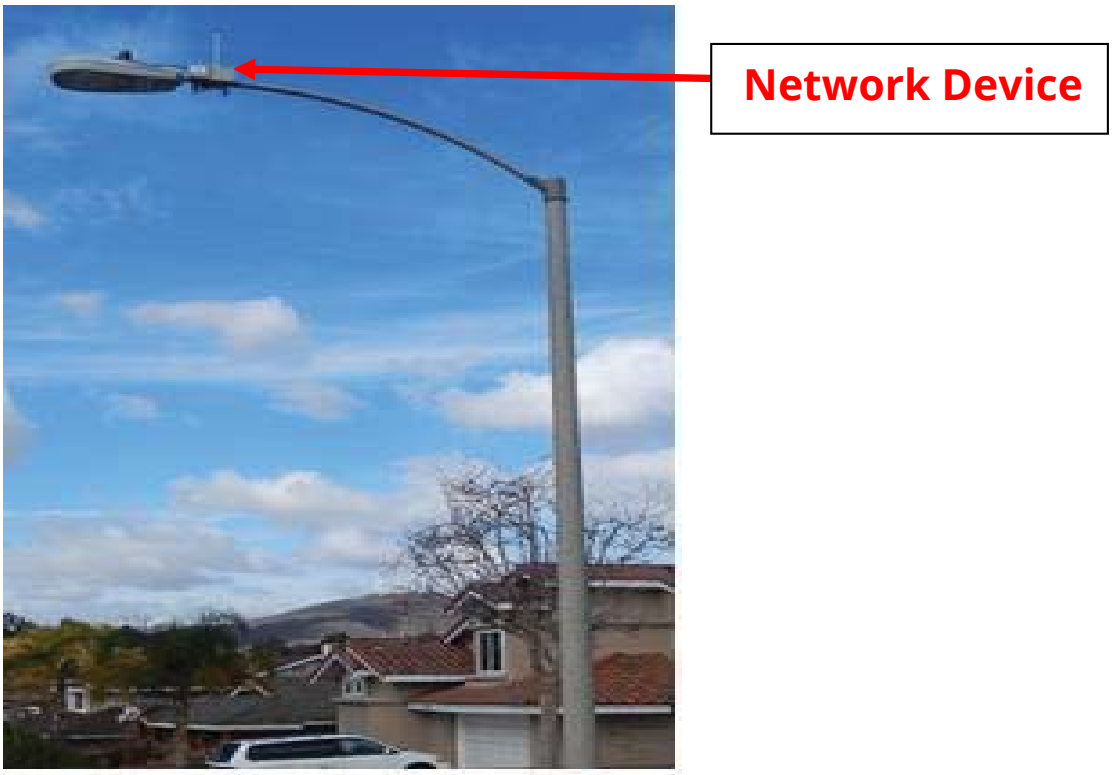


Photo 9

If you encounter any bad installations, disconnected/broken/buried endpoints, or inadvertently damage any AMI devices or cables, notify the Resident Engineer immediately. The Resident Engineer will then immediately contact the AMI Project Manager, Arwa Sayed, at (619) 362-0121.

ATTACHMENT F

RESERVED

ATTACHMENT G

CONTRACT AGREEMENT

CONTRACT AGREEMENT

CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and Soltek-ECC A Joint Venture , herein called "Contractor" for construction of **Pacific Highlands Ranch Branch Library**; Bid No. **K-22-1950-DBB-3-A;** in the total amount Twenty Million One Hundred Eighty Four Thousand Six Hundred Twenty Three Dollars and Zero Cents ($20,184,623.00), which is comprised of the Base Bid plus Additive Alternates A, consisting of an amount not to exceed $20,184,623.00.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:
   (a) The attached Faithful Performance and Payment Bonds.
   (b) The attached Proposal included in the Bid documents by the Contractor.
   (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).
   (d) That certain documents entitled **Pacific Highlands Ranch Branch Library**, on file in the office of the City Clerk as Document No. **S-14023**, as well as all matters referenced therein.
2. The Contractor shall perform and be bound by all the terms and conditions of this contract and in strict conformity therewith shall perform and complete in a good and workmanlike manner **Pacific Highlands Ranch Branch Library**, Bid Number **K-22-1950-DBB-3-A,** San Diego, California.
3. For such performances, the City shall pay to Contractor the amounts set forth at the times and in the manner and with such additions or deductions as are provided for in this contract, and the Contractor shall accept such payment in full satisfaction of all claims incident to such performances.
4. No claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.
5. This contract is effective as of the date that the Mayor or designee signs the agreement and is approved by the City Attorney in accordance with San Diego Charter Section 40.

IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

THE CITY OF SAN DIEGO

By _____

Print Name: Claudia Abarca
Director
Purchasing & Contracting Department

Date: May 9, 2022

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By _____

Print Name: Dana Fairchild
Deputy City Attorney

Date: 5/12/2022

CONTRACTOR

By _____

Print Name: Stephen W. Thompson

Title: Partner

Date: 3/11/2022

City of San Diego License No.: B0222002596

State Contractor's License No.: 944999

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: PW-LR-1000872226

CERTIFICATIONS AND FORMS

The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certifications, forms and affidavits submitted as part of this bid are true and correct.

BIDDER'S GENERAL INFORMATION

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106

State of California

County of San Diego

The bidder, being first duly sworn, deposes and says that he or she is authorized by the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

CONTRACTOR CERTIFICATION

DRUG-FREE WORKPLACE

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 5-1.3, "Drug-Free Workplace", of the project specifications, and that;

This company has in place a drug-free workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of subdivisions a) through c) of the policy as outlined.

CONTRACTOR CERTIFICATION

AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-4 regarding the Americans With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 5-1.2, "California Building Code, California Code of Regulations Title 24 and Americans with Disabilities Act", of the project specifications, and that:

This company has in place workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of the policy as outlined.

CONTRACTOR CERTIFICATION

CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE

I declare under penalty of perjury that I am authorized to make this certification on behalf of the company submitting this bid/proposal, that as Contractor, I am familiar with the requirements of City of San Diego Municipal Code § 22.3004 regarding Contractor Standards as outlined in the WHITEBOOK, Section 5-1.4, ("Contractor Standards and Pledge of Compliance"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

CONTRACTOR CERTIFICATION

EQUAL BENEFITS ORDINANCE CERTIFICATION

I declare under penalty of perjury that I am familiar with the requirements of and in compliance with the City of San Diego Municipal Code § 22.4300 regarding Equal Benefits Ordinance.

CONTRACTOR CERTIFICATION

EQUAL PAY ORDINANCE CERTIFICATION

Contractor shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) at section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.

Contractor shall require all of its subcontractors to certify compliance with the EPO in their written subcontracts.

Contractor must post a notice informing its employees of their rights under the EPO in the workplace or job site.

By signing this Contract with the City of San Diego, Contractor acknowledges the EPO requirements and pledges ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.

CONTRACTOR CERTIFICATION

PRODUCT ENDORSEMENT

I declare under penalty of perjury that I acknowledge and agree to comply with the provisions of City of San Diego Administrative Regulation 95.65, concerning product endorsement. Any advertisement identifying or referring to the City as the user of a product or service requires the prior written approval of the City.

AFFIDAVIT OF DISPOSAL

(To be submitted upon completion of Construction pursuant to the contracts Certificate of Completion)

WHEREAS, on the _____ DAY OF _____, 2_____ the undersigned entered into and executed a contract with the City of San Diego, a municipal corporation, for:

Pacific Highlands Ranch Branch Library
(Project Title)

as particularly described in said contract and identified as Bid No. **K-22-1950-DBB-3-A;** SAP No. (WBS) **S-14023** _____; and **WHEREAS**, the specification of said contract requires the Contractor to affirm that "all brush, trash, debris, and surplus materials resulting from this project have been disposed of in a legal manner"; and **WHEREAS**, said contract has been completed and all surplus materials disposed of:

_____

_____

NOW, THEREFORE, in consideration of the final payment by the City of San Diego to said Contractor under the terms of said contract, the undersigned Contractor, does hereby affirm that all surplus materials as described in said contract have been disposed of at the following location(s)

_____

_____

and that they have been disposed of according to all applicable laws and regulations.

Dated this _____ DAY OF _____, _____.

By:_____
Contractor

ATTEST:

State of _____ County of _____

On this_____ DAY OF _____, 2_____, before the undersigned, a Notary Public in and for said County and State, duly commissioned and sworn, personally appeared_____ known to me to be the _____ Contractor named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractor executed the said Release.

Notary Public in and for said County and State

LIST OF SUBCONTRACTORS

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY*** SEE INSTRUCTIONS TO BIDDERS, FOR FURTHER INFORMATION**

In accordance with the requirements of the "Subletting and Subcontracting Fair Practices Act", Section 4100, of the California Public Contract Code (PCC), the Bidder is to list below the name, address and license number of each Subcontractor who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement, in an amount of or in excess of 0.5% of the Contractor's total Bid. Failure to comply with this requirement may result in the Bid being rejected as non-responsive. The Contractor is to list only one Subcontractor for each portion of the Work. The Bidder's attention is directed to the Special Provisions – General; Paragraph 2-3 Subcontracts, which stipulates the percentage of the Work to be performed with the Bidder's own forces. The Bidder is to also list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which the Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②	CHECK IF JOINT VENTURE PARTNERSHIP
Name: Address: City: State: Zip: Phone: Email:							
Name: Address: City: State: Zip: Phone: Email:							

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC		
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

NAMED EQUIPMENT/MATERIAL SUPPLIER LIST

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY *** SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION**

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②
Name:_____ Address:_____ City:_____ State:_____ Zip:_____ Phone:_____ Email:_____						
Name:_____ Address:_____ City:_____ State:_____ Zip:_____ Phone:_____ Email:_____						

① As appropriate, Bidder shall identify Vendor/Supplier as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Vendor/Supplier is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC		
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

ELECTRONICALLY SUBMITTED FORMS

FAILURE TO FULLY COMPLETE AND SUBMIT ANY OF THE FOLLOWING FORMS WILL DEEM YOUR BID NON-RESPONSIVE.

PLANETBIDS WILL NOT ALLOW FOR BID SUBMISSIONS WITHOUT THE ATTACHMENT OF THESE FORMS

The following forms are to be completed by the bidder and submitted (uploaded) electronically with the bid in PlanetBids.

A. **BID BOND – See Instructions to Bidders, Bidders Guarantee of Good Faith (Bid Security) for further instructions**

B. **CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS**

C. **SUBCONTRACTOR LISTING FOR ALTERNATE ITEMS**

D. **MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM**

E. **DEBARMENT AND SUSPENSION CERTIFICATION FOR PRIME CONTRACTOR**

F. **DEBARMENT AND SUSPENSION CERTIFICATION FOR SUBCONTRACTORS, SUPPLIERS AND MANUFACTURERS**

BID BOND

See Instructions to Bidders, Bidder Guarantee of Good Faith (Bid Security)

KNOW ALL MEN BY THESE PRESENTS,

That Soltek-ECC A Joint Venture as Principal, and Hartford Fire Insurance Company as Surety, are held and firmly bound unto The City of San Diego hereinafter called "OWNER," in the sum of **10% OF THE TOTAL BID AMOUNT** for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled

Pacific Highlands Ranch Branch Library

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" enters into a written Agreement on the form of agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this 29th day of December, 2021

Soltek-ECC A Joint Venture (SEAL)
(Principal)

By: _____
(Signature)

Hartford Fire Insurance Company (SEAL)
(Surety)

By: _____
(Signature)
Lawrence F. McMahon, Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Civil Code § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

STATE OF CALIFORNIA

County of San Diego }

On DEC 29 2021 (Date) before me, Sarah Myers (Insert Name of Notary exactly as it appears on the official seal), Notary Public,

personally appeared Lawrence F. McMahon (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature _____ (Signature of Notary Public) Sarah Myers

SARAH MYERS
Notary Public - California
San Diego County
Commission # 2316482
My Comm. Expires Nov 30, 2023

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of the form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☑ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:
Surety Company

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-11
One Hartford Plaza
Hartford, Connecticut 06155
Bond.Claims@thehartford.com
call: **888-266-3488** *or fax:* **860-757-5835**

KNOW ALL PERSONS BY THESE PRESENTS THAT:

Agency Name: ALLIANT INSURANCE SERVICES INC
Agency Code: 72-160200

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of*** Unlimited :

Lilia De Loera, Maria Guise, Janice Martin, Lawrence F. McMahon, Sarah Myers of SAN DIEGO, California

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on May 23, 2016 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Shelby Wiggins

Shelby Wiggins, Assistant Secretary

Joelle L. LaPierre

Joelle L. LaPierre, Assistant Vice President

STATE OF FLORIDA
COUNTY OF SEMINOLE } **ss.** Lake Mary

On this 20th day of May, 2021, before me personally came Joelle LaPierre, to me known, who being by me duly sworn, did depose and say: that (s)he resides in Seminole County, State of Florida; that (s)he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that (s)he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that (s)he signed his/her name thereto by like authority.

Jessica Ciccone

Jessica Ciccone
My Commission HH 122280
Expires June 20, 2025

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of December 29, 2021.

Signed and sealed in Lake Mary, Florida.

Keith D. Dozois

Keith D. Dozois, Assistant Vice President

CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

CHECK ONE BOX ONLY.

☒ The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.

☐ The undersigned certifies that within the past 10 years the Bidder has been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers. A description of the status or resolution of that complaint, including any remedial action taken and the applicable dates is as follows:

Date of Claim	Location	Description of Claim	Litigation (Y/N)	Status	Resolution/Remedial Action Taken

Contractor Name: Soltek-ECC A Joint Venture

Certified By Sherri Summers Title Partner

Name

Sherri R Summers Date 01/19/22

Signature

USE ADDITIONAL FORMS AS NECESSARY

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE

***** FOR USE WHEN LISTING SUBCONTRACTORS ON ALTERNATES *****

(Use Additional Sheets As Needed)

ADDITIVE/DEDUCTIVE ALTERNATE	SUBCONTRACTOR NAME, LOCATION, PHONE & EMAIL	CONSTRUCTOR OR DESIGNER	DIR REGISTRATION NUMBER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED	CHECK IF JOINT VENTURE PARTNERSHIP
	Name:____________ Address:____________ City:__________ State:________ Zip:________ Phone:__________ Email:____________								
	Name:____________ Address:____________ City:__________ State:________ Zip:________ Phone:__________ Email:____________								
	Name:____________ Address:____________ City:__________ State:________ Zip:________ Phone:__________ Email:____________								

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC		
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

Legal Name		DBA	
Soltek-ECC A Joint Venture		N/A	
Street Address	**City**	**State**	**Zip**
2424 Congress Street	San Diego	CA	92110
Contact Person, Title		**Phone**	**Fax**
Jim Summers , President ECC		619-440-7181	619-440-7180

Provide the name, identity, and precise nature of the interest* of all persons who are directly or indirectly involved** in this proposed transaction (SDMC § 21.0103).

* The precise nature of the interest includes:
- the percentage ownership interest in a party to the transaction,
- the percentage ownership interest in any firm, corporation, or partnership that will receive funds from the transaction, the value of any financial interest in the transaction,
- any contingent interest in the transaction and the value of such interest should the contingency be satisfied, and any
- philanthropic, scientific, artistic, or property interest in the transaction.

** Directly or indirectly involved means pursuing the transaction by:
- communicating or negotiating with City officers or employees,
- submitting or preparing applications, bids, proposals or other documents for purposes of contracting with the City,
- or directing or supervising the actions of persons engaged in the above activity.

Name	Title/Position
Sherri Summers	CEO
City and State of Residence	**Employer (if different than Bidder/Proposer)**
Lakeside, CA	EC Constructors Inc
Interest in the transaction	
Partner of the Joint Venture	

Name	Title/Position
Stephen W Thompson	CEO
City and State of Residence	**Employer (if different than Bidder/Proposer)**
San Diego, CA	Soltek Pacific Construction Company
Interest in the transaction	
Partner of the Joint Venture	

*** Use Additional Pages if Necessary ***

Under penalty of perjury under the laws of the State of California, I certify that I am responsible for the completeness and accuracy of the responses contained herein, and that all information provided is true, full and complete to the best of my knowledge and belief. I agree to provide written notice to the Mayor or Designee within five (5) business days if, at any time, I learn that any portion of this Mandatory Disclosure of Business Interests Form requires an updated response. Failure to timely provide the Mayor or Designee with written notice is grounds for Contract termination.

Sherri Summers, Partner	Sherri Summers	01/19/22
Print Name, Title	Signature	Date

Failure to sign and submit this form with the bid/proposal shall make the bid/proposal non-responsive. In the case of an informal solicitation, the contract will not be awarded unless a signed and completed Mandatory Disclosure of Business Interests Form is submitted.

DEBARMENT AND SUSPENSION CERTIFICATION

PRIME CONTRACTOR

FAILURE TO COMPLETE AND SUBMIT AT TIME OF BID SHALL RENDER BID NON-RESPONSIVE

EFFECT OF DEBARMENT OR SUSPENSION
To promote integrity in the City's contracting processes and to protect the public interest, the City shall only enter into contracts with responsible- bidders and contractors. In accordance with San Diego Municipal Code §22.0814 (a): *Bidders* and *contractors* who have been *debarred* or *suspended* are excluded from submitting bids, submitting responses to requests for proposal or qualifications, receiving *contract* awards, executing *contracts*, participating as a *subcontractor*, employee, agent or representative of another *person* contracting with the City.

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of Names of the Principal Individual owner(s).

The names of all persons interested in the foregoing proposal as Principals are as follows:

NAME	TITLE
Sherri Summers	Partner
Jim Summers	Partner
Stephen W Thompson	Partner
Kevin Cammall	Partner

IMPORTANT NOTICE: If Bidder or other interested person is a corporation, state secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if Bidder or other interested person is an individual, state first and last names in full.

The Bidder, under penalty of perjury, certifies that, except as noted below, he/she or any person associated therewith in the capacity of owner, partner, director, officer, manager:

- Is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal, State or local agency;
- has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal, State or local agency within the past 3 years;
- does not have a proposed debarment pending; and
- has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Contractor Name: Soltek-ECC A Joint Venture

Certified By: Sherri Summers (Name) Title: Partner

Sherri Summers (Signature) Date: 01/19/22

NOTE: Providing false information may result in criminal prosecution or administrative sanctions.

DEBARMENT AND SUSPENSION CERTIFICATION

SUBCONTRACTORS, SUPPLIERS AND MANUFACTURERS

TO BE COMPLETED BY BIDDER

FAILURE TO COMPLETE AND SUBMIT AT TIME OF BID SHALL RENDER BID NON-RESPONSIVE

Names of the Principal individual owner(s)

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Please indicate if principal owner is serving in the capacity of **subcontractor, supplier,** and/or **manufacturer**:

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NAME	TITLE

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NAME	TITLE

Contractor Name: Soltek-ECC A Joint Venture

Certified By Sherri Summers Title Partner

Name

Sherri Summers Date 01/19/22

Signature

USE ADDITIONAL FORMS AS NECESSARY*

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Contractor Name: Soltek-ECC A Joint Venture

Certified By Sherri Summers Title Partner

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Name

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NAME	TITLE

Contractor Name: Soltek-ECC A Joint Venture

Certified By Sherri Summers Title Partner

Name

Sherri Summers Date 01/19/22

Signature

USE ADDITIONAL FORMS AS NECESSARY*

Bid Results

Bidder Details

Vendor Name	Soltek-ECC A Joint Venture
Address	2424 Congress Street San Diego, California 92110 United States
Respondee	Jim Summers
Respondee Title	Partner
Phone	619-440-7181
Email	jim@ecconstructors.com
Vendor Type	
License #	944999
CADIR	

Bid Detail

Bid Format	Electronic
Submitted	02/02/2022 1:55 PM (PST)
Delivery Method	
Bid Responsive	
Bid Status	Submitted
Confirmation #	275139

Respondee Comment

Buyer Comment

Attachments

File Title	File Name	File Type
B. Contractors Certification of Pending Actions.pdf	B. Contractors Certification of Pending Actions.pdf	CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS
C. Subcontractor Listing for Alternate items.pdf	C. Subcontractor Listing for Alternate items.pdf	SUBCONTRACTOR LISTING FOR ALTERNATE ITEMS
D. Mandatory Disclosure.pdf	D. Mandatory Disclosure.pdf	MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM
E. Debarment and Suspension - Prime Contractor.pdf	E. Debarment and Suspension - Prime Contractor.pdf	PRIME - DEBARMENT AND SUSPENSION CERTIFICATION
F. Debarment and Suspension - Subcontractor.pdf	F. Debarment and Suspension - Subcontractor.pdf	SUBS, SUPPLIERS, MANUF. - DEBARMENT AND SUSPENSION CERTIFICATION
Bid Bond Signed.pdf	Bid Bond Signed.pdf	Bid Bond

Subcontractors

Showing 22 Subcontractors

Name & Address	Desc	License Num	CADIR	Amount	Type
Arce Custom Cabinets, Inc. 8845 Winter Gardens Blvd Lakeside, California 92040	Casework	930618	1000005414	$420,718.00	FEM, LAT, CADIR, ELBE, Local
Arrow Automatic Fire Sprinkler, Inc. 9520 Pathway Street Santee, California 92071	Fire Sprinkler	422176	1000011841	$110,600.00	CADIR, WBE, WOSB, FEM, CAU, Local
Ceiling City Inc. PO Box 300367 Escondido, California 92030	Acoustical Tile	932596	1000010332	$165,450.00	Local
Coast Landscaping Inc. 2230 La Mirada Dr Ste B Vista, California 92081	Landscape	353359	1000004310	$453,000.00	CAU, MALE, PQUAL, CADIR, Local
Communication Wiring Specialists, I 8909-F Complex Dr. San Diego, California 92123	Telecom	623901	1000002370	$144,911.00	PQUAL, CADIR, MALE, CAU, Local
Continental Marble & Tile Company 2460 Anselmo Drive Corona, California 92879	tile	394	1000002594	$337,294.00	
DeRollo Pipeline 2588 El Camino Real, #F320 Carlsbad, California 92008	Site Utilities	1039738	1000818181	$425,700.00	SDB, MBE, CADIR, DBE, MALE, LAT, Local
E.L. Hobbs, Inc. 1900 Weld Blvd. Suite 215 El Cajon, California 92020	plaster	777073	1000004428	$349,600.00	CAU, MALE, CADIR, Local
Goforth & Marti Business Interiors 110 West A Street Suite 140 San Diego, California 92101	Install & Delivery FFE	944352	1000001979	$118,093.00	MBE, CADIR, FEM, PAC, Local
JMS Interiors 10612 Prospect Ave. Santee, California 92071	gypsum Board	489412	1000577858	$234,000.00	Local
KCB Towers Inc 27260 Meines Street Highland, California 92346	Structural Steel	503206	1000001570	$973,990.00	
Mech One, Inc. PO Box 301864 Escondido, California 92030	hvac	934023	1000001944	$550,000.00	DVBE, FEM, SDVSB, SLBE, WBE, WOSB, Local
Pratt Equipment Corp. PO Box 2546 Vista, California 92085	Earthwork	847624	1000016735	$154,000.00	SDB, SLBE, Local
Premier Consultant Services 672 Bordon Road San Marcos, California 92069	Special Testing	E22025	1000052711	$102,592.00	CADIR, DBE, SDB, SLBE, WBE, WOSB, FEM, Local
ProSpectra Contract Flooring 13250 Gregg St, Suite F Poway, California 92064	Flooring	740392	1000002810	$123,625.00	Local

Rock Electric, Inc. 7950 Silverton Ave, Ste 211 San Diego, California 92126	electrical	646958	1000002693	$1,715,000.00	PQUAL, Local
San Diego Sheet Metal, Inc. 1128 Bay Blvd Suite G Chula Vista, California 91911	Sheet Metal / Metal Roofing	1047664	1000063457	$736,800.00	CADIR, PQUAL, Local
SealRight Paving, Inc. 9053 Olive Dr. Spring Valley, California 91977	Asphalt	364113	1000039542	$91,869.00	DBE, MBE, CADIR, MALE, LAT, Local
Sun Pacific Glazing 747 Grand Ave Spring Valley, California 91977	Glazing	777178	1000013937	$786,674.00	Local
Team West Contracting Corporation 1611 Jenks Drive Corona, California 92880	Decorative Fencings	934352	1000768825	$344,534.00	DBE, MBE
Weber's Plumbing 33345 Fowler Driver PO Box 549 Winchester, California 92596	Plumbing	444338	1000856354	$304,000.00	DVBE, SDB
Yamada Enterprises 16552 Burke Lane Huntington Beach, California 92647	Library Shelving	582159	1000001651	$695,000.00	CAU, FEM, CADIR

Line Items

Discount Terms No Discount

Item #	Item Code	Type	Item Description	UOM	QTY	Unit Price	Line Total	Response	Comment
Main Bid							$20,045,662.00		
1	524126		Bonds (Payment and Performance)	LS	1	$162,845.00	$162,845.00	Yes	
2	236220		Building Permits & Utility Fees (EOC Type I)	AL	1	$160,000.00	$160,000.00	Yes	
3			Field Orders (EOC Type II)	AL	1	$1,470,000.00	$1,470,000.00	Yes	
4	541330		SWPPP Development	LS	1	$28,632.00	$28,632.00	Yes	
5	237310		SWPPP Implementation	LS	1	$52,500.00	$52,500.00	Yes	
6	541330		SWPPP Permit Fee (EOC Type I)	AL	1	$2,000.00	$2,000.00	Yes	
7	236220		Construction of Pacific Highlands Ranch Branch Library	LS	1	$16,283,969.00	$16,283,969.00	Yes	
8	236220		Furnitures, Fixtures, and Equipments (FFE) (EOC Type I)	AL	1	$1,150,000.00	$1,150,000.00	Yes	
9	236220		Telecom/ Data (EOC Type I)	AL	1	$600,000.00	$600,000.00	Yes	
10	236220		Installation of Artwork	LS	1	$135,716.00	$135,716.00	Yes	
Additive Alternate A							$138,961.00		
11	236220		Promendade Plaza Improvements	LS	1	$138,961.00	$138,961.00	Yes	

Line Item Subtotals

Section Title	Line Total
Main Bid	$20,045,662.00
Additive Alternate A	$138,961.00
Grand Total	$20,184,623.00

Line Totals (Unit Price * Quantity)								
Item Num	**Section**	**Item Code**	**Description**	Reference	**Unit of Measure**	**Quantity**	**Soltek-ECC A Joint Venture - Unit Price**	**Soltek-ECC A Joint Venture - Line Total**
1	Main Bid	524126	Bonds (Payment and Performance)	1-7.2.1	LS	1	$162,845.00	$162,845.00
2	Main Bid	236220	Building Permits & Utility Fees (EOC Type I)	2-2.3	AL	1	$160,000.00	$160,000.00
3	Main Bid		Field Orders (EOC Type II)	7-3.9	AL	1	$1,470,000.00	$1,470,000.00
4	Main Bid	541330	SWPPP Development	1001-3.7	LS	1	$28,632.00	$28,632.00
5	Main Bid	237310	SWPPP Implementation	1001-3.7	LS	1	$52,500.00	$52,500.00
6	Main Bid	541330	SWPPP Permit Fee (EOC Type I)	1001-3.7	AL	1	$2,000.00	$2,000.00
7	Main Bid	236220	Construction of Pacific Highlands Ranch Branch Library	7-3.1	LS	1	$16,283,969.00	$16,283,969.00
8	Main Bid	236220	Furnitures, Fixtures, and Equipments (FFE) (EOC Type I)	7-3.1	AL	1	$1,150,000.00	$1,150,000.00
9	Main Bid	236220	Telecom/ Data (EOC Type I)	7-3.1	AL	1	$600,000.00	$600,000.00
10	Main Bid	236220	Installation of Artwork	7-3.1	LS	1	$135,716.00	$135,716.00
							Subtotal	$20,045,662.00
11	Additive Alternate A	236220	Promendade Plaza Improvements	7-3.1	LS	1	$138,961.00	$138,961.00
							Subtotal	$138,961.00
							Total	$20,184,623.00